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Vol. 156, No. 3 July 19, 1945

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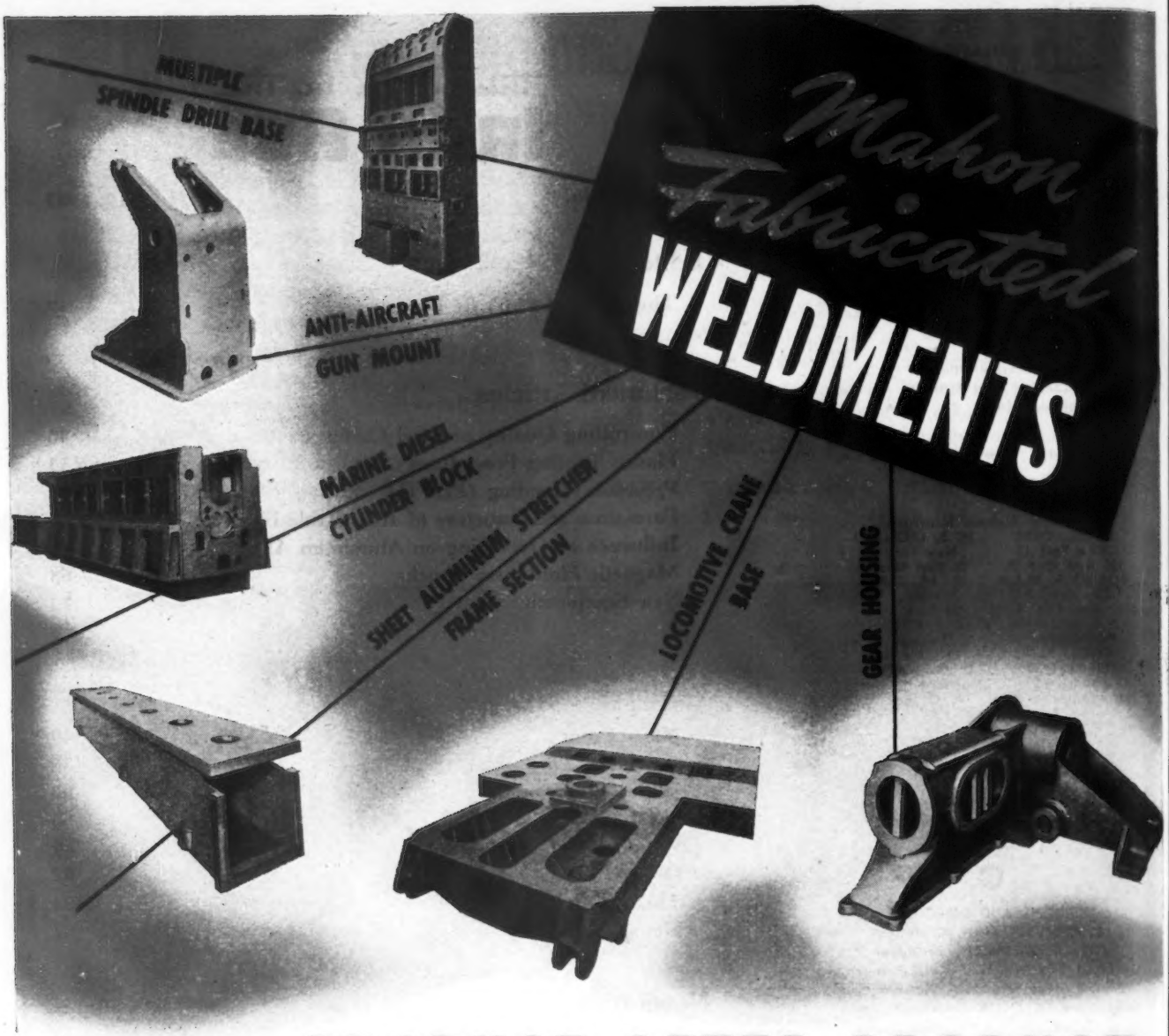

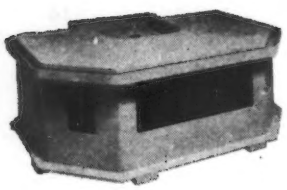

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The IRON AGE

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The Can and Can't Be Doners

THERE are so many different kinds of people that it is pretty hard to classify them except by physical characteristics. And that is not as important as is mental outlook.

Of course, if you look inside of people's heads, you do find an extremely varied range of thoughts but by and large you can put everyone into one of two pigeonholes according to his thinking. One of these would be labeled "The Can-Be-Doners" and the other "The Can't-Be-Doners." The residue, after this sifting, consisting of those who don't think at all you could drop into the waste-basket except for the fact that they vote and therefore have a hand in determining national policies.

The Can-Be-Doners must not be confused with optimists who invariably wear a smile and think things are hotsy totsy. Most Can-Be-Doners have sense enough to recognize that things can be very bad indeed or not nearly good enough, but have guts enough to determine to make them better.

One degree or possibly 33 degrees worse than the optimist is the egoist. He believes that anything can be done, "but only by me and the Grace of God." I am glad that President Truman is just a Can-Be-Doner who believes in surrounding himself with capable assistants to do the things that can and should be done.

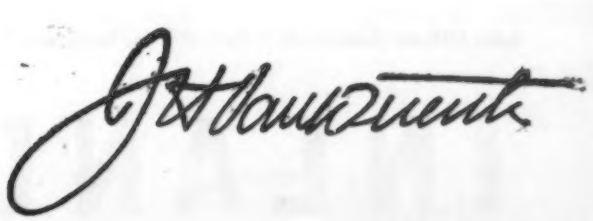
I have never known a successful businessman, industrialist, inventor, labor leader or leader of our Armed Forces who wasn't a Can-Be-Doner. Nor have I ever known of a business being built from the ground up by a Can't-Be-Doner, or successfully perpetuated by one. On the other hand I have seen many that have been utterly ruined because one of these chaps crawled into control through an upper story window by inheritance or other accident.

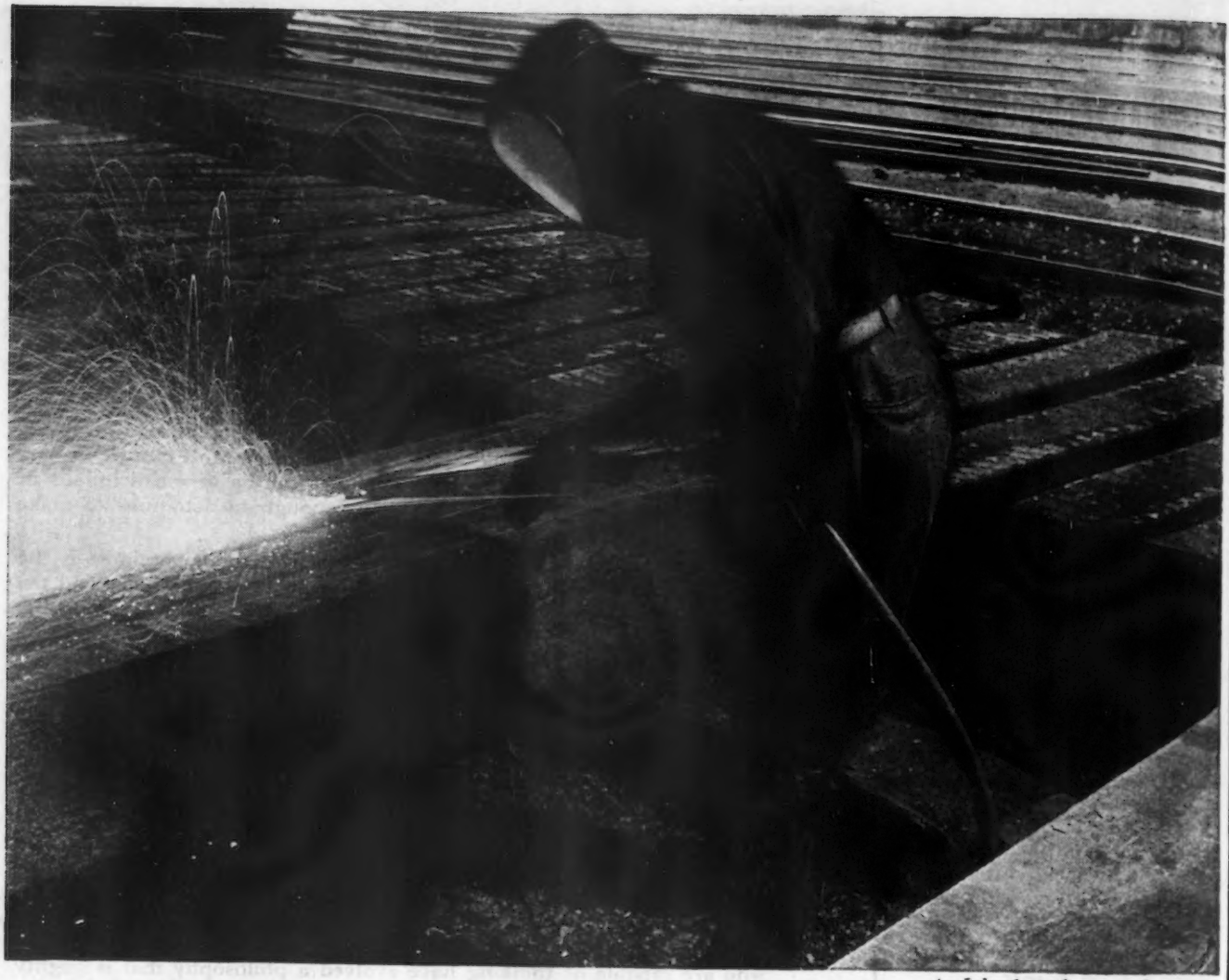
So why all of this foregoing fuss and furor about the Can't-Be-Doners? You might say that they never have amounted to anything anyway and never will.

The answer to that is, that the comparatively few Can't-Be-Doners who are capable of thinking have evolved a philosophy that is mighty attractive to the millions more of them who are incapable of thought. It is the defeatist doctrine of economic maturity.

Their thesis is that nearly everything has been done that can be done and that from now on our economy must be static instead of dynamic. Old "Doc" Townsend of California gave them the idea of how popular this thought could be in his campaign for "Forty a week after fifty." Then along came Lord Keynes of England, advocate of accumulative national debt; Dr. Alvin H. Hansen, of this country, to echo the thought; and bad boy economist—but clever publicist, Stuart Chase, who wanted to swap the Constitution for technocracy. These and a hundred little brains of the late and unlamented New Deal gave voice to the doctrine of economic defeatism. And into their camp swarmed a motely assortment of regimenters, regulators, political buzzards who hoped to fatten on decay and a horde of hand-me-outers.

You who read this page, and the other pages of this and other journals, whose function it is to help people do more are all Can-Be-Doners. And you will be glad to know that your belief in a bigger and better America is substantiated by facts. You can find them in "The Bogey of Economic Maturity," by George Terborgh, recently published by the Machinery & Allied Products Institute, 221 North La Salle St., Chicago. It's a must for Can-Be-Doners.





An Inland scarfer at work on a 12" x 12" bloom.

Inland "Flame Throwers" Help Make Better Steel

Scarfing with oxy-acetylene is an important procedure at the Inland mill because it helps to assure a satisfactory surface. In some cases rolled forms, such as the blooms shown above, are hand scarfed before shipment. In other instances the steel is automatically scarfed while hot and while it is still in the mill. Examples of mechanical scarfing can be seen at the Inland blooming mills, where slabs and blooms, at rolling heat, are scarfed by clusters of oxy-acetylene torches. These then pass on to continuous sheet and strip mills.

Scarfing is one of the many modern methods used by Inland to produce quality steels.

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INLAND STEEL

The IRON AGE
July 17, 1945

NEWS FRONT

► The new postwar jeep announced this week by Willys-Overland will be a combination truck-tractor-power takeoff-passenger conveyance, member of a family of Willys vehicles in the low price range on which production is starting.

Used as a tractor the postwar jeep appears to be able to do about everything but cultivate certain row crops to which the tread width is not suitable. In the field the jeep has a drawbar pull of 1200 lb and on the highway it pulls a trailer load of 5500 lb with adequate reserve power for grades. Marketing will be through a strengthened distributor-dealer organization.

► Despite the close approach of United Nations troops to tin producing regions of the East Indies, it will be a minimum of two years after conquest before reasonable quantities of tin can be exported into the United States. Meanwhile, it can be anticipated that restrictions on the use of tin will be drawn even tighter by WPB.

► While chromium has long been considered a critical material by WPB, imports are reported to have dropped significantly during the past half-year due to the requirement of an import certificate that artificially limits importation.

► A member of the SPB has proposed that a western corporation, publicly financed, be established for purchase and operation of Geneva, and perhaps Fontana. If Geneva is not purchased by a western corporation, it is possible that the government may consider closing it.

► In a new study of the Geneva Steel potential markets, Dr. Mahoney stresses the importance of the western tinplate market divided between 35 canners and dominated by eight integrated steel companies.

His conclusion is that Geneva should complement and not compete with other western steel plants. He suggests that the sale price of the plant could be based on a fair value per ton of usable capacity, and by periodically reappraising the value of the plant according to percentage of capacity the market could absorb.

► Postwar plans of Canadian manufacturing industry call for widely dispersed plant construction. Of $1.5 billion expended for war plants it is believed that most new plants can be utilized for postwar industry.

► There is some speculation among members of the SPB that coast aluminum plants might be converted into steel fabricating plants and become part of an integrated western steel industry, and that shipyards might make excellent auto assembly plants.

► British industrialists have a far-reaching plan to assist in the revival and subsequent maintenance of export trade. The industries have co-operatively established their own organization for conducting market research and maintaining a trade intelligence service throughout the world.

This British Export Trade Research Organization, the so-called Betro, will have London headquarters and branches in every overseas territory. London also will have a "flying squad" of expert research personnel ready to go overseas at short notice to carry out market research in any given territory.

► The Skoda Works, Pilsen, Czechoslovakia, was hard hit by Allied bombs almost on the last day of the war. The Czech Ministry of Industry reported the plant about 70 per cent ruined, but such reports always over-emphasize bomb damage and later investigation shows the plant for the most part superficially damaged.

► Skoda had been drawn within the Hermann Goering combine, and now as a "masterless enterprise" it has, like many other plants, become a State enterprise. Foreign shareholders of Skoda have received assurances that they will receive indemnity if full nationalization is decided upon, which is very likely.

► The recent exchange of French currency for a new issue of notes dropped outstanding circulation from $11,800,000,000 to $8,000,000,000, or roughly one third of the whole circulation. This exchange has weeded out the notes destroyed or looted, and those held by black marketeers and otherwise improperly acquired. And: now that the exchange is practically completed, the stage is set for a capital levy and war-profits tax.

Controlling Quality of

QUALITY control when applied to steel castings means that the character and overall properties are consistently and uniformly maintained from casting to casting according to predetermined standards. The quality level involved, such as chemical, metallurgical, soundness and other casting properties, is dictated by the intended service requirements. Therefore, since design and application of steel castings covers wide and diversified uses, the basic specification requirements must be adjusted in accordance with satisfactory service performance. The quality level or degree of perfection of each casting design should be definitely established so that production castings can be definitely fixed standards of acceptance.

Records show that quality control of steel castings for railroad use started many years ago. Regular production castings were subjected to severe overloads and often tested to complete destruction. These tests afforded the engineer and steel foundryman fundamental information as to the quality of the casting, the effect of variable degrees of external and internal defects, as well as valuable design data. With these test results, coupled with actual service records, standards of acceptance for railroad steel castings were formed and are now reasonably well understood. Many railroad castings are in service today after 35 years of satisfactory performance, yet these castings may contain surface and internal defects of varying proportions. These defects are not considered injurious, whereas similar defects in a highly stressed airplane landing gear, for example, could not be permitted.

Highest quality steel castings, approaching a level of perfection, are not only being produced, but have filled a large place in the war program. When the highest level of casting quality and uniformity is desired, the production of such parts requires:

(1) Strict adherence to design principles for directional solidification
(2) Exacting process controls for manufacture
(3) Non-destructive inspection for the standard of quality required.

The highest standards for casting quality require more confining and exact process controls of each operation, since the quality must be engineered into the casting and cannot be derived by inspection means alone. In order to be assured of the high quality desired, certain extra or special methods of inspection are involved, such as radiography, magnetic particle surveys or other searching nondestructive tests for hidden discontinuities of the minutest nature. Naturally, these special operations add appreciably to the cost of the manufacturing process, and since economic considerations cannot be neglected, the desired quality level must be carefully selected with that factor in mind.

Steel castings, like steel ingots, are subject to surface and internal defects. These defects must be found and removed when required, but unlike billets or blooms, must also be filled in by proper repair welding. Satisfactory repair welding can be accomplished with rods capable of producing comparable physical properties after final heat treatment.

Failure to observe the proper control and design requirements leads to defects of the following character:

Refractory or mold sand defects
Internal shrinkage
Cracks and tears
Gas porosity
Slag, etc.

Inspection for quality several years ago depended largely upon visual examination alone. Other tests for

[1] *See also ASTM Tentative Standard E-15-39T, Radiographic Testing of Metal Castings.*

[2] *ASTM Tentative Standard A272-44T, Magnetic Particle Testing and Inspection of Steel Castings.*

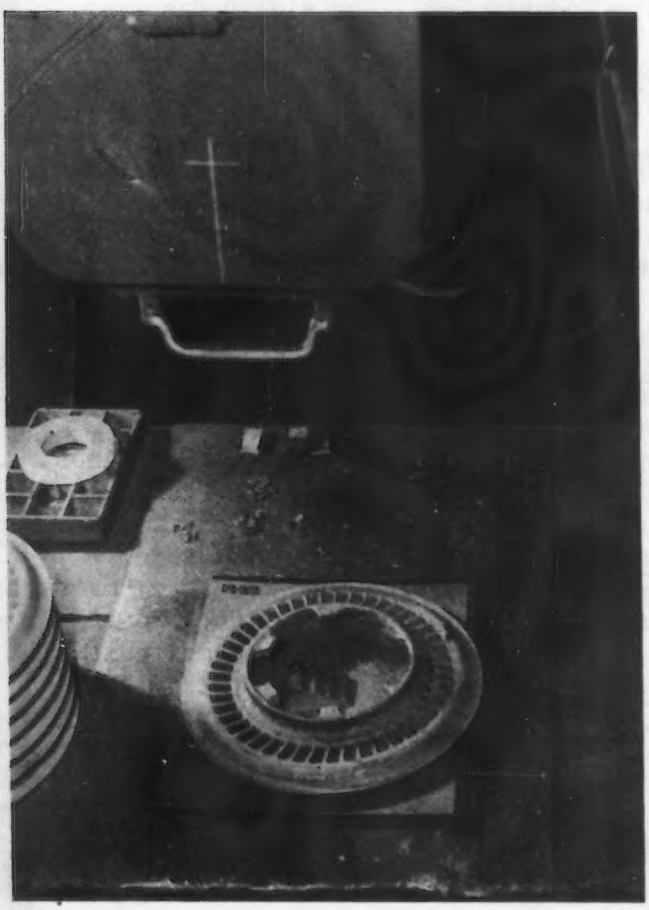

FIG. 2 — X-ray examination of austenitic steel casting. This is an example of production work subject to 100 per cent radiographic examination.

Steel Castings

By JOHN W. JUPPENLATZ
Chief Metallurgist,
Lebanon Steel Foundry, Lebanon, Pa.

soundness were destructive and obviously not used on production castings. Visual examination still remains an effective means of quality inspection for commercial grades of steel castings; however, when the requirements become more exacting, other methods of inspection are employed.

. . . Although many non-destructive tests are now in commercial use for checking the soundness of steel castings, high quality is something that must be built into the product rather than inspected into it. Many inspection checks, while too costly except for the most critical castings, do serve to prove pilot methods which can be maintained in production under proper controls.

Radiographic Tests

The most common and presently accepted method of non-destructive testing is radiography (Figs. 1 and 2). Details of procedure need not be included here since excellent technical articles are available.[1] Since 1926, when some of the first high pressure cast steel fittings were X-rayed, Gamma-ray (radium) techniques, Fig. 2, have been developed for the heavy sections of castings involved. The cost of films and the operating expense has limited this mode of inspection to critical castings. Recently radiography has been accepted by some foundries as a working tool for the complete exploration of all pilot castings before entering production. With such a practice on pilot castings, the foundry is aware of internal shrinkage or other defects and may improve methods or make design changes to overcome these difficulties before production is started.

This method of quality control has definitely raised the general quality level that may be expected from steel castings since properly controlled repetitive methods should yield equally sound castings without the expense of 100 per cent radiographic inspection.

Radiographic working standards with proper interpretation are essential and must be clearly understood by both the foundry and user. Incomplete knowledge or lack of workable standards for acceptance can easily defeat the useful purpose of this test.

The magnetic particle test within the past decade has gained prominence as an inspection method applicable to magnetic types of castings. The American Society for Testing Materials has adopted a tentative standard[2] for this method and several technical articles are available on the subject. The magnetic particle test is primarily limited to surface defects only. When the proper flux density is applied with a subsequent magnetic powder application, surface discon-

RIGHT

FIG. 3—Magnetic particle test on a high pressure, low alloy valve body during the cleaning process. Surface defects, when present, are easily disclosed that would not be found by normal visual inspection. Operators are checking the internal areas for bore defects.

BELOW

FIG. 1—Gamma-ray inspection of pilot casting for high pressure, high temperature steam service, showing procedure used for complete coverage of flange with one exposure.

FIG. 4—An alloy heat resisting casting being inspected by the penetrant-fluorescent method. Surface defects, which are cracks in this instance, fluoresce with brilliance that would not be disclosed by visual examination alone.

tinuities are quickly indicated by a buildup of the magnetic powder. A casting may be completely surveyed with a lower overall cost than by radiography. In some instances, sensitivity of the magnetic particle test is greater than radiography due to the plane of the defect, which is generally at right angles to the surface. Small cracks of only a few thousandths of an inch in depth are revealed that an X-ray would not uncover. Of course, defects of this nature are not normally visible to the eye. The magnetic particle test, on the other hand, has not proven to be of any particular value in disclosing internal defects and it therefore does not replace radiography, but rather supplements it. The magnetic particle test is applied usually to only the higher types of quality castings, Fig. 3, where service requirements justify the added expense.

Fluorescent Method

The fluorescent method of inspection is now being applied to both non-magnetic and magnetic types of cast materials. This method is useful for the determination of surface defects only. Internal defects are not disclosed and therefore the method is similar in the end result to the magnetic particle test. The equipment required is not extensive, nor any part of the operation difficult.

The casting to be inspected is immersed in, or sprayed with, a prepared highly fluorescent, light, water soluble, penetrating oil. After approximately a 10 min. soaking period, the oil is allowed to drain from the casting and the excess oil on the surface is washed away with warm water. The casting is permitted to dry and is then ready for examination in a darkened room under a violet-ray light (black lamp), with or without the use of a developing powder being dusted over the surface. Any surface defects then appear to fluoresce with a degree of brilliance in accordance to size and direction (see Fig. 4).

Other non-destructive tests such as hydrostatic and air pressure tests are employed in the steel foundry. Proof tests or static loading to a point just below the yield point, with measurement of any permanent set, are often made on rough or finished castings. Supersonic inspection of steel castings is one of the newer methods of non-destructive testing, which when further developed and understood should become a more widely used means in the determination of soundness. Foreign reports have frequently discussed this commercial method of test; however, details and its scope of use are at present limited in this country.

Jig gaging on production castings as a final inspection is used, Fig. 5, as a means to insure adequate stock for machining, including the proper fit of the casting into machine tool fixtures. Individual layout procedure, with thorough checking of dimensional tolerances and wall thickness, is always a recommended practice on pilot sample castings. It is difficult to indicate limits of dimensional tolerance in a blanket manner but plus or

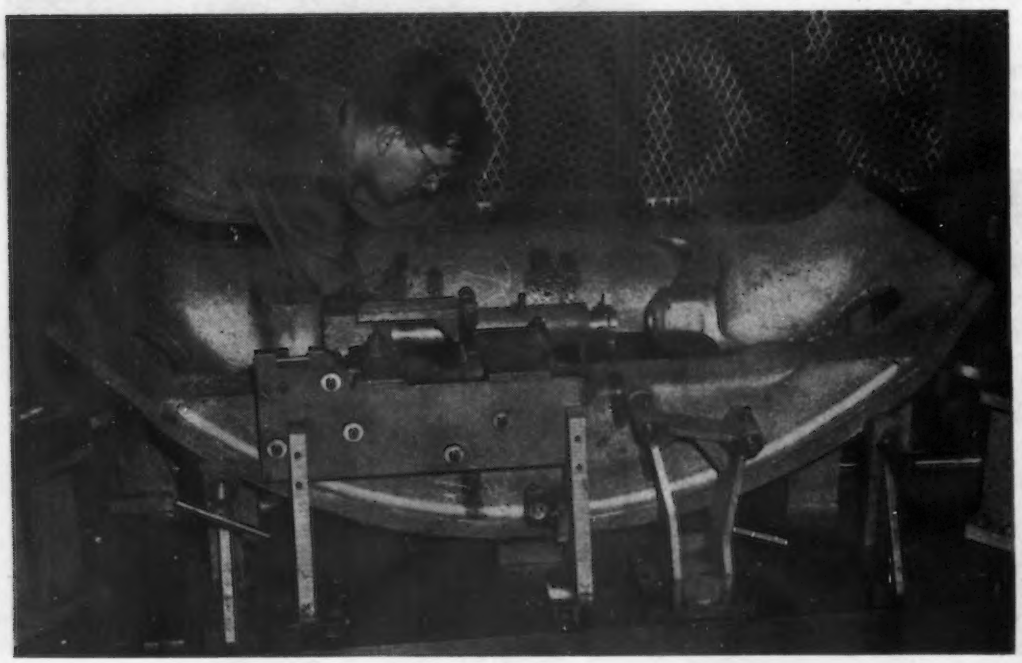

FIG. 5 — A heat-treated, high tensile alloy casting being jig-gaged in target fixture before shipment. This inspection insures proper and adequate finish allowances with overall dimensional tolerances suitable for subsequent production machining operations.

minus 5 per cent or plus or minus 1/16 in. wall thickness in the thinner wall sections has been accepted for certain classes of steel castings. Close dimensional tolerances are only possible with proper patterns and other auxiliary equipment.

Design Precautions

Quality steel castings are not dependent upon non-destructive testing methods alone. Quality castings begin during the early stages of design. Close collaboration between the designer and the steel foundryman is vitally important, but only too often neglected. Good practical designs which permit the foundryman to carefully plan his production methods, with directional solidification possibilities built into the design, are essential for highest quality. It is not possible, for example, to feed metal from thin sections to thick sections, since the thinner section freezes early, while the heavy section is still molten. Directional solidification involves controlling the rate of solidification so that freezing will normally occur at the thinnest cross-section and gradually progress from that point toward the heaviest cross-section involved, which then may be adequately fed with hot metal from a suitably placed riser. With the tapering and blending of wall sections built into the original design, sounder castings with freedom from internal shrinkage can be produced. Other methods of indirectly controlling directional solidification are available, such as the differential thermal gradients resulting from the planning of heading and gating, effective chilling of areas or padding (tapering) of sections which must be removed as exemplified by Fig. 6.

Designs with restraint should be avoided, as these often result in "hot tears." Blending or streamlining heavy sections into lighter sections is always desirable, as well as the avoidance of abrupt angles with inadequate fillets. Proper designs always afford the foundryman the opportunity to adequately feed the casting for freedom of internal shrinkage. Good quality castings cannot be produced from every design and should not be expected. Many complex or "impossible" steel casting designs can best be produced with two or more castings welded into a unit.

Process controls of actual foundry operations are not only desirable but essential for the highest quality levels. Each and every step of production must be fully controlled so as to coincide with the previous or the subsequent operations.

Properly made pattern equipment is equally as important as design. From this point on, the quality of the casting remains in the hands and head of the steel foundryman. He must carefully plan his methods of heading, gating, molding and pouring. The most preferable method of heading and gating is to incorporate these essential parts of the rough casting on the pattern equipment usually mounted integrally on a board, Fig. 6. This step leaves little to the individual molder's judgment and insures duplication of the methods on subsequent castings once good practice has been established.

It has been pointed out that other phases are under process control such as molding sands, cores, analysis of metal with other metallurgical qualities, including pouring rate and temperature of the molten metal (Fig. 7). After production under known conditions, the pilot casting is subjected to visual and non-destructive examinations by some of the previously outlined methods. If this sample casting has failed to be of the quality

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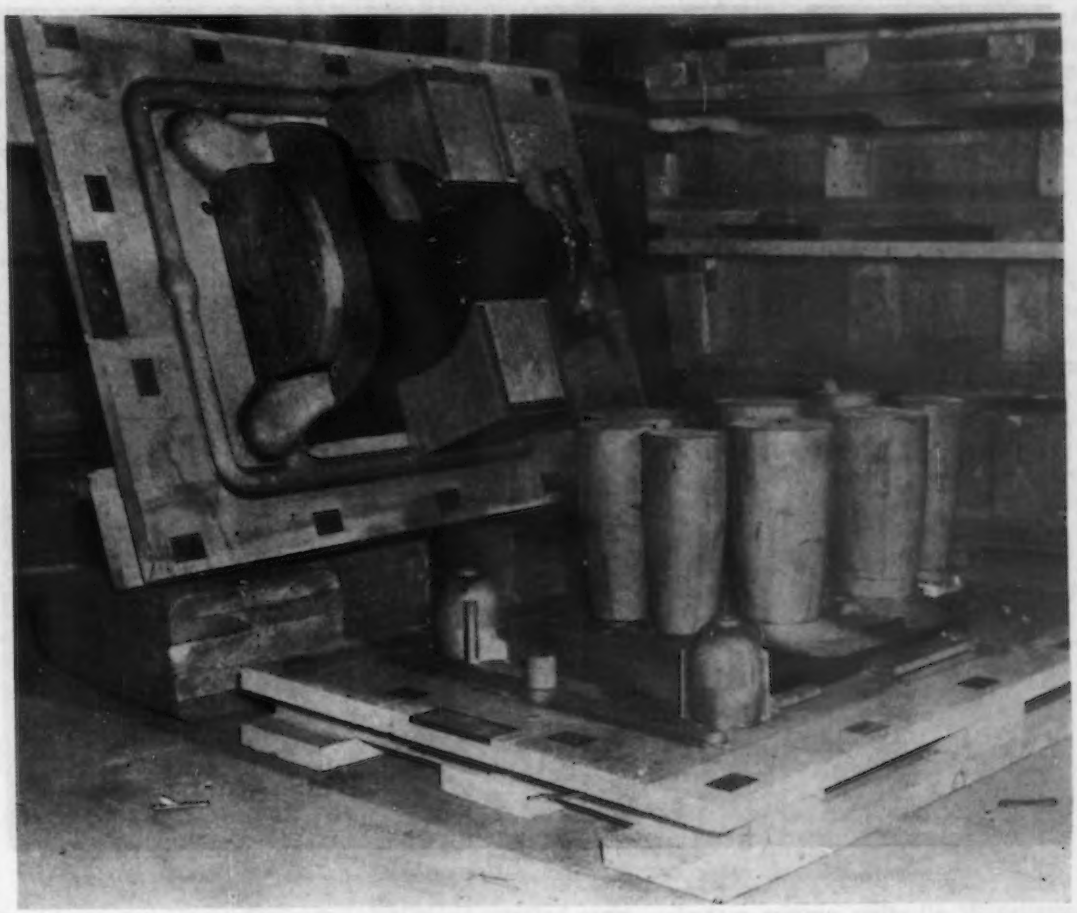

FIG. 6 — Pattern equipment used for pump case casting. Cope and drag pattern boards are shown with heading and gating carefully planned for a casting to meet radiographic standards for internal soundness. Note the padding required under each riser for directional solidification. This padding must be removed during cleaning room operations.

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or grade desired, changes are usually made in the basic foundry planning or requests are made of the customer or engineering department for adjustments in design. Once the pilot sample casting has met the quality requirements, production may start and under the same controlled methods, similar quality castings may be reasonably expected.

After periodic non-destructive testing, internal soundness can be easily compared with the condition of the pilot casting, thereby assuring that production castings are of equivalent quality, if all other process controls are maintained. As previously stated, sand, refractory or other blemishes may occur which are usually of surface origin. These minor defects must be located, removed and properly repaired by welding with welding rods which produce physical properties comparable to those of the parent cast metal after final heat treatment.

Heat Treating Factors

Under process controlled operations, it may be assumed that a satisfactorily sound casting has been produced which is dimensionally correct and ready for subsequent heat treatment. Heat treating practice should be conducted under well controlled conditions, in uniformly heated and properly constructed furnaces. Simple annealing treatments are still satisfactory for lower tensile strength requirements, but within the past few years, homogenizing, normalizing, quenching and tempering (or any combination) under controlled conditions has had an influential effect on the use and performance of high tensile steel castings. Cast armor is a good example where exacting controls for quality must be maintained in the heat treatment, since ballistic testing of each casting is not possible.

Of course, after heat treatment, physical properties of the castings are checked by process control methods such as tensile, impact, hardness and other tests. Hardness tests are often taken on a percentage of castings from each heat treatment batch and when required 100 per cent of the castings are so inspected.

Visual final inspection of all castings is essential. Additional inspection of high quality castings may entail a 100 per cent inspection by one or more of the foregoing non-destructive methods. When stisfactory quality is consistently found and maintained, the frequency of testing may be substantially reduced.

Inspection by any method adds a burden upon the ultimate cost of the casting which in turn is reflected into the cost. Unnecessary inspection is therefore a waste of manhours and should be held to a minimum. This can be accomplished by a thorough understanding of the service requirement, with specifications properly written for the grade or quality needed.

Interpretation of acceptable standards of the steel casting quality is of the utmost importance. Only too often, inexperienced inspectors have misinterpreted requirements of acceptable standards of quality which directly resulted in the scrapping of many useful castings, or an excessive amount of rework and repair. The acceptable standards therefore should be carefully considered, clearly defined and mutually agreed upon before undertaking any commitment.

Quality steel castings can and are being produced in a large way. Some designs cannot be economically made nor can a reasonable quality level be maintained. Close collaboration of the designer and the steel foundryman, with a mutual understanding of all requirements, should tend to elevate the quality of steel castings with properly coordinated steel foundry process control methods.

FIG. 7—Checking the pouring temperature with an optical pyrometer. Mold as well as metal has been produced under process controlled conditions.

Plastic Tooling Procedures

. . . The many advantages that may be derived from plastics in the fabrication of such tools as formed router blocks, forming dies, hydropress form blocks, scribe jigs, as well as jigs for drill, punch and saw, are presented together with sample applications in an effort to provide a yardstick by which the different types of plastics materials may be measured for individual applications. In the first of this two-part article the author takes up techniques for handling thermosetting casting resins and laminates having paper, fabric and Fiberglas bases.

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By E. L. MARIS
Manufacturing Research, Lockheed Aircraft Corp. Burbank, Calif.

TOOLS made of plastics can often be put into the production line in a shorter interval than is the case with steel, and the economy attained through the employment of plastics is especially impressive where contours are involved. Research done at the Lockheed Aircraft Corp., Burbank, Calif., for a period of two years has resulted in some unusual techniques for handling the plastics, their fabrication with other materials and the incorporation of different type plastics in the same tool. For purposes of this article it may be convenient to discuss first the characteristics and fabricating methods of certain plastic materials which have proven to be time savers at Lockheed and subsequently to give the sequence of application of methods and materials in the construction of sample tools. The plastics are treated here in the following order:

1. Thermosetting casting resins (such as Baker's casting resin).
2. Phenolic impregnated paper base laminates (Dilecto, Panelyte, Richlite).
3. Phenolic impregnated fabric base laminates (Panelyte, Micarta, Phenolyte).
4. Colloid treated fabric base laminates (Celastic).
5. Glass base laminates (Fiberglas).
6. Thermoplastic casting materials (Tenite II, Plastalloy and Ethocel).

Baker's Casting Resin

Thermosetting casting resins often referred to as "phenolics" are used in making such tools as master tooling models, formed router blocks, drill jigs, inspection check gages, saw jigs, shaper blocks, scribe jigs, and forming dies.

Phenol-formaldehyde, a synthetic resin made by the reaction of phenol and formaldehyde, is a basic plastic for thermosetting casting resins that are manufactured under numerous trade names, as for example, Baker's Casting Resin.

The synthetic resin is obtained in a thick liquid state; for casting, an acid catalyst and a filler are added. The accelerated reaction of the acid catalyst on the resin with the aid of heat causes polymerization. The filler, which is usually redwood flour or asbestos, makes the casting less expensive and more resistant to fracture.

The plastic casting is a hard, inflexible material having sufficient strength for its recommended applications. It is chemically inert, and insoluble. The usual solvents, alcohol, benzine, turpentine, lacquer thinner,

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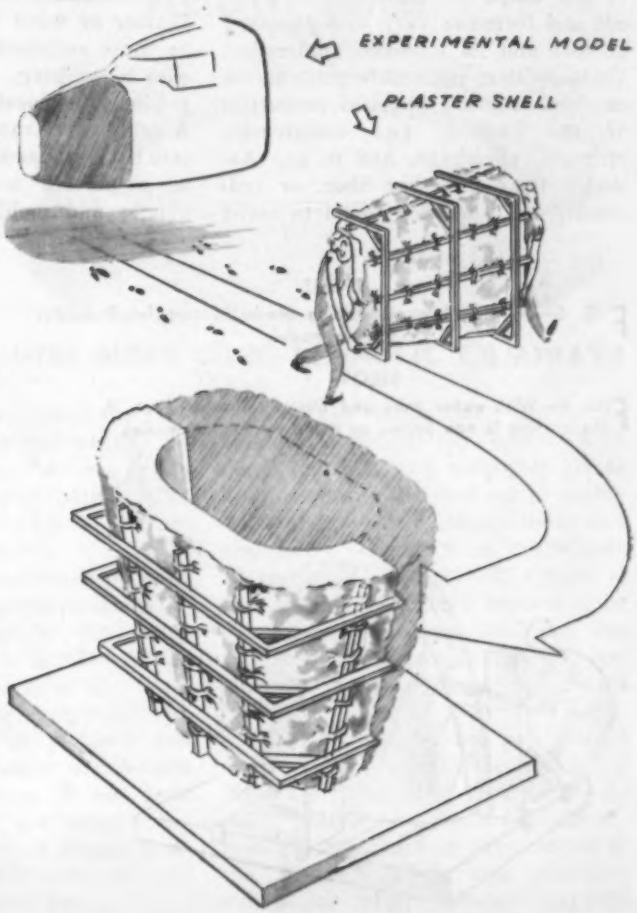

FIG. 1—The plaster mold is made from plaster shells taken off experimental model.

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ABOVE

FIG. 2—Approximate contour of the inside mold surface is reproduced as a plywood core.

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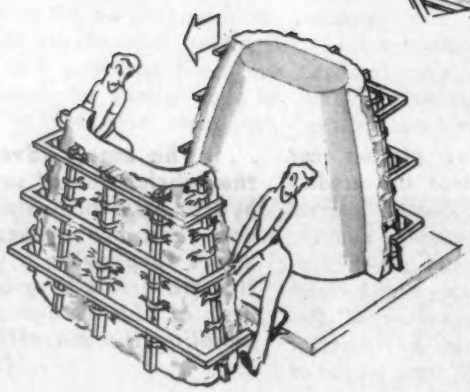


AFTER STANDING TO ALLOW AIR BUBBLES TO RISE, THE COMPLETE SET-UP IS BAKED UNTIL MIXTURE HAS HARDENED. WHEN COOL, MOLD IS REMOVED.

RIGHT

FIG. 3—Procedure for casting a master tooling model. After mold is removed, the casting is lacquered and checked to templates.

etc., will not materially affect it; nor will water, oil, or gasoline.

Its color is variable, depending on the pigment in the resin. The surface is identical to the mold surface.

Castings may be made to conform to any shape or contour. The methods and formulas vary with the type of tool and its intended application. Various fillers react differently to the catalyst, altering physical properties of the casting, i.e., compressive strength, shrinkage, and so on. Asbestos flour, asbestos fiber, or redwood flour have been found to resist the acid, and when used as fillers with the aid of a covert product have eliminated after-shrinkage completely.

Molds for casting the plastic may be made from plaster, wood, metal, glass, cardboard, the plastic itself, or a combination of any of the same. Plaster or wood have been found to be most satisfactory because of the ease in working. The plastic will reproduce the finest detail of the mold. A cellulose nitrate or a cellulose acetate butyrate lacquer is generally used as a parting medium between the plastic and mold surface except in glass molds where no medium is needed. A thin coat of wax placed on the lacquer aids the removal of the casting from the mold.

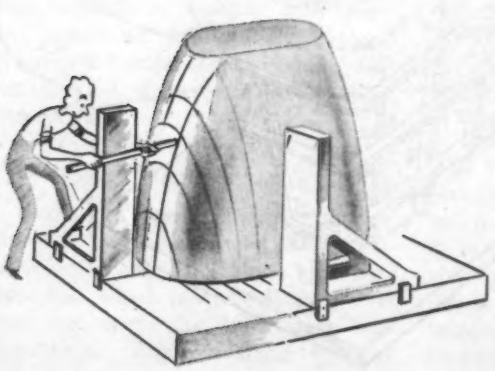
To prepare the plastic for castings, the following general procedure is followed: The amount of resin, filler, and catalyst is carefully calculated. The resin is then drained from the container into a metal mixing bowl and the filler thoroughly mixed into the resin, an electrical motor driven cake mixer being used. The catalyst is then added and the whole is thoroughly stirred.

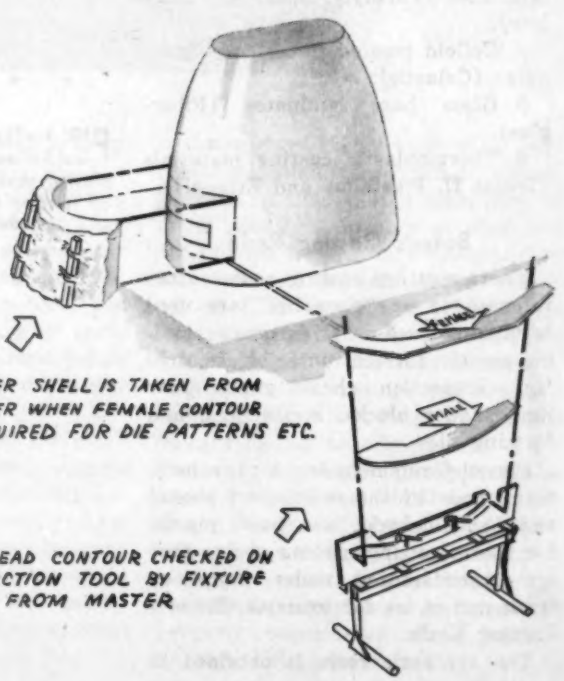
RIGHT

FIG. 5—Showing two uses being made of completed master tooling model.

BELOW

FIG. 4—With water lines and butt lines scribed on it, the casting is now known as a master tooling model.




PLASTER SHELL IS TAKEN FROM MASTER WHEN FEMALE CONTOUR IS REQUIRED FOR DIE PATTERNS ETC.
BULKHEAD CONTOUR CHECKED ON PRODUCTION TOOL BY FIXTURE TAKEN FROM MASTER

After thorough stirring, the plastic is poured into the mold. Precautions are taken to avoid trapping of air in casting as the trapped air results in flaws. In most molds air vents are provided. The plastic is poured into the lowest part of the mold forcing the air out as it works its way upward to the top.

Castings are left to stand at room temperature from 2 to 4 hr. before oven curing, to allow air bubbles to rise to the top surface and to permit exothermic heat of chemical reaction to be expended. The castings are baked in an oven at 170 deg. F. for several hours depending upon the volume of the castings and the thicknesses and materials of the mold sections, through which heat must pass to penetrate the plastic. In general, the castings are removed when they are hard and solid; an overnight cure is usually sufficient. Insufficient oven heating results in weak, brittle, castings; over-long heating does not appreciably harm them. The combination of heat and acid reaction of the catalyst solidifies and hardens the phenolic.

The castings are cleaned with denatured alcohol after removal from molds, and sealed with a lacquer sealer.

Machining the castings is done with wood working tools and machines. Machining the phenolic, involves the same speed, depth of cut, etc., that govern work on any dense but slightly brittle material. In castings where excessive machining is contemplated, the use of redwood flour as a filler is preferable in that asbestos tends to dull machine cutting tools.

Practically all tools made of thermosetting casting resin are constructed with a wooden core and faced with approximately a ⅜-in. thick layer of phenolic on the working surface of the tool. The phenolic when cast directly to wood, adheres securely. Thus, the wood has a threefold purpose: (1) It lightens the tool, (2) it affords a satisfactory foundation for a thin layer of plastic (the thin cross-section of plastic cures more rapidly than a solid casting) also a suitable base to which brackets, hold-down fixtures and accessories may be attached, and (3) it eliminates all initial shrinkage.

Illustrated in the series of sketches (Figs. 1-5) is the general sequence of operations in making a plastic master tooling model.

A full scale plaster model of a loft layout in three dimensions is made to the inside or outside mold line of the skin of an airframe assembly. Because the plaster model is not dimensionally stable over a long period of time, and because a dimensionally stable plastic has been developed, a duplicate of the plaster model is made of plastic to be used for a permanent reference.

In Fig. 1, plaster shells are taken from the plaster model. The shells are so constructed that they will form into a closed mold with only the top open. Care is maintained in constructing the shells to insure adequate reinforcement and to eliminate possible warping which would distort the contour; also wall thicknesses of the mold are held rather constant to facilitate even heat distribution. The inner surface is lacquered to prevent plastic from adhering.

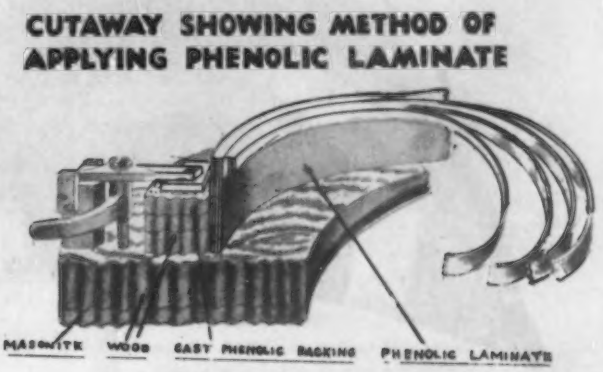
In Fig. 2, a waterproof plywood core is shaped to correspond to the approximate contour of the inside mold surface. Space is allowed for plastic, between the core and mold surface. The core is constructed by laminating sheets of plywood and rough sawing the edges to simulate the respective contour of the mold section. Dowel pins are properly located to hold the core in proper position in the mold. Air vents are provided at advantageous points.

The rough core is positioned in the mold and properly fastened to avoid possible shifting.

Previously prepared thermosetting casting resin is poured into the mold, completely sealing the wooden core with phenolic. The cast resin is allowed to stand at room temperature for the necessary number of hours required to permit air in the mix to rise to the top surface and to permit exothermic heat from chemical reaction to be expended.

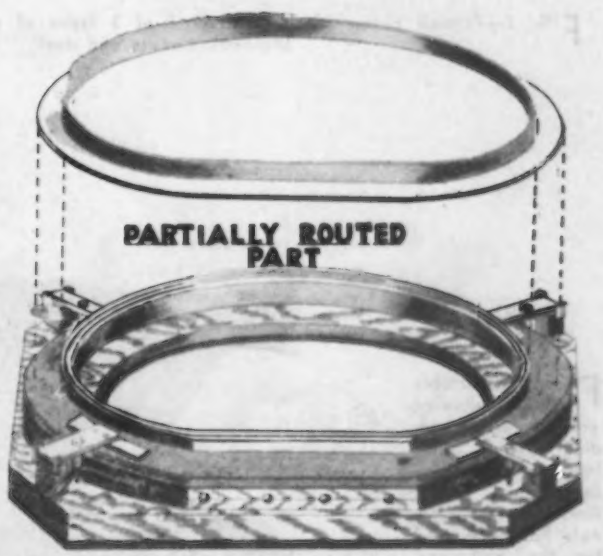
After the preliminary curing or partial polymerization has taken place, the mold and casting is placed in an oven and the final set or curing takes place. This operation takes several hours depending on the volume of the mold (Fig. 3). The mold is then removed from the casting after it has been taken from the oven. The casting is subsequently cleaned, lacquered and checked for accuracy with templates.

Finished castings are not always dimensionally accurate especially if they are large and the tolerances small. Molds sometimes lose dimensional stability during oven curing of the plastic. When this condition exists the plastic model may be



CUTAWAY SHOWING METHOD OF APPLYING PHENOLIC LAMINATE

FIG. 6—Fabric base phenolic impregnated laminates are especially suitable for guides in tools such as the router block illustrated



ROUTER BLOCK USING PHENOLIC LAMINATE

splined to templates using scrapers and sanders providing the model is oversized; or additional resin may be added and cured with heat lamps if the casting is undersized.

In Fig. 4, water lines, butt lines, and reference lines are scribed and colored for visual aid. Reference lines were transferred through the operations from the plaster model, to the plaster shells and finally to the plastic casting. The casting is attached to a suitable steel base. After lacquering, the tool is complete, and is known as a master tooling model. The completed plastic master tooling model demonstrating typical methods of obtaining die contours, etc., and method of obtaining contour check fixtures for checking production tooling is illustrated in Fig. 5.

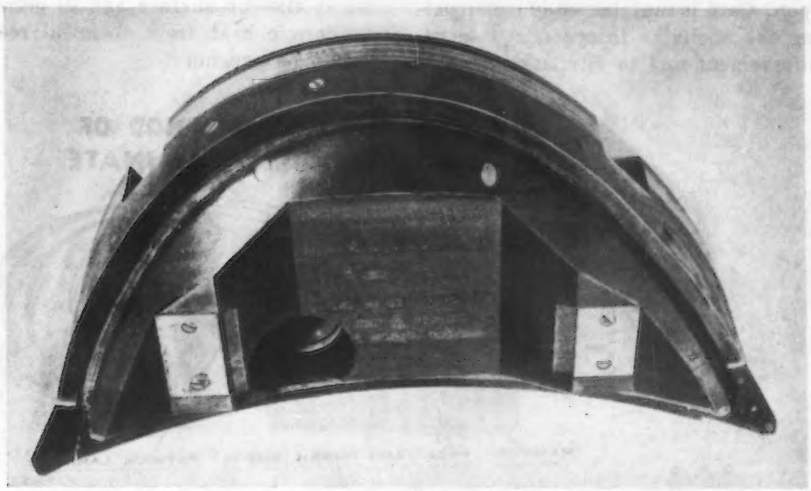


FIG. 7—Formed router block constructed of 3 types of plastics, wood, plywood, Masonite, Kirksite and steel

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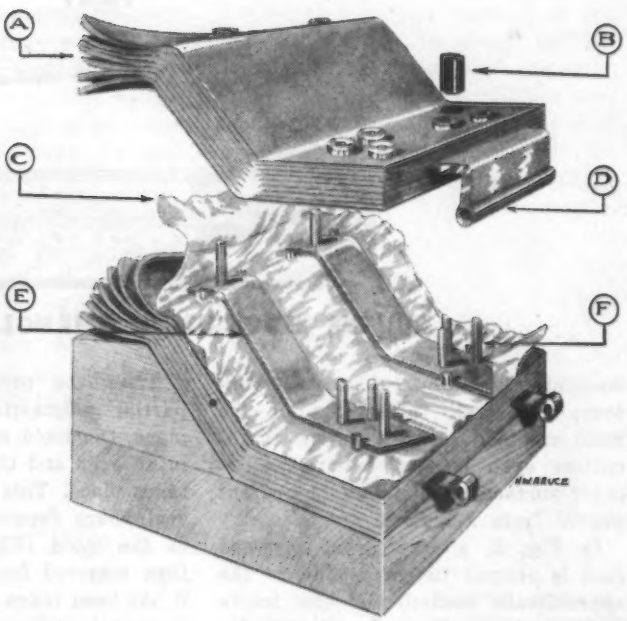

FIG. 9—A portable drill jig, showing process for embedding hinges, bushings, and pins in Celastic layers. In this illustration the laminate has been used for the nest and drill plate. Parts designated by letters in the illustration are as follows: A—Celastic sheets, B—drill bushing, C—cellophane, D—embedded hinge, E—sample part, F—bushing guide pins.

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Furthermore, the master affords a permanent dimensionally stable model that can be used to establish contours of checking gage, tool contour templates, cast patterns, blue blocks and fixtures, and to establish trim lines and hole locations on jigs.

Laminates of the phenolic impregnated paper base type are manufactured under several trade names such as, Dilecto, Panelyte, Richlite, etc.

The tools that are made of, or partially made of these laminates, are: Hydropress and hand form block, such as are used to form flanges and joggles and are free of double contours; drill jigs such as junction boxes; router blocks—the laminate being used as guide bases for pin routers. Best applications are for single plane contoured tools and for structural combination with other materials.

The processes used in making the laminated phenolic plastics are very similar; basically they are: (1) The manufacture of the thermosetting synthetic resin, (2) the impregnation of the paper and (3) the pressing and curing of the impregnated sheet by the use of heat and extremely high pressure.

When the impregnated sheet is subjected to heat and pressure the several individual layers of paper and phenolic are compressed and cured into a dense homogeneous mass.

The laminates are manufactured in a wide variety of grades, depending on the paper base and the resin content, and the reaction of the ingredients. Each specific grade is intended for a specific use and is formulated to possess definite characteristics. Some grades are primarily intended for electrical insulation applications and possess very good insulating qualities while other grades are made to serve in mechanical capacities, and are strong and tough. The grades designed for mechanical applications are employed for tooling at Lockheed. The finished surfaces of these laminates are attractive, they are supplied with a dull, semi-gloss, and a polished finish. The colors are black, and natural which varies from a light brown to a dark brown. Standard sheet sizes are: 38 x 38, 38 x 43, 38 x 96, 39 x 46 and 46 x 70 in. and in thicknesses from 0.010 to 2.0 in. inclusive.* The laminates are hard, rigid, materials having relatively high tensile strength (8000 lb. per sq. in), compressive strength (3400 lb. per sq. in.) and flexural strength (16,000 lb. per sq. in.).* They are dimensionally stable. For most practical purposes they may be considered as chemically inert, insoluble, and infusible. The usual solvents such as alcohol, benzine, turpentine, lacquer thinner, etc., have no effect on them nor does water, oil, or gasoline.

The light weight of the laminated plastics (approx. ½ that of aluminum) makes their application to tool-

* Dilecto Grade XX Quoted.

ing preferable to that of metals, when the performance is satisfactory.

Machining qualities of the plastics are very good. They can be sheared, sawed, shaved, punched, milled, turned, drilled, reamed, threaded, sanded and stamped. In machining, practically the same rules apply as in machining brass. Highest possible speeds and the use of carbide tipped tools are recommended by the manufacturers.

Fabric Base Laminates

Phenolic impregnated fabric based laminates are manufactured under trade names, among them Panelyte, Micarta, and Phenolite. These laminated sheets are used in conjunction with other materials to make tools such as, horizontal router blocks, the fabric based laminate being used as the guide, shown in the tool illustrated in Fig. 6. They are also used as bases for attached tool accessories, as for example, hold-down clamps. The fabric base has excellent holding qualities for screws, pins, etc.

The processes used in making these laminates are basically the same as those used in making the paper base laminates except that fabric is used in place of paper. Like the paper base laminates they are manufactured in a wide variety of grades depending on the base material used, the resin content and the reaction of the ingredients. The grades intended for mechanical applications are the ones referred to in this article.

The laminates used at Lockheed are made of high grade, heavy weave, cotton fabric base, and are strong, tough and abrasive resistant. They are obtainable in sheet sizes of 36 x 36, 36 x 48, 48 x 60, 48 x 30 in. and in thicknesses from 0.015 in. up to and including 2.0 in.

The finished surfaces of these laminates are semi-glossy and are usually natural in color which is a light brown. Like the paper base laminates, for most practical purposes, they may be considered as chemically inert, insoluble, and infusible. The usual solvents such as alcohol, benzine, turpentine, lacquer thinner, etc., have no effect on it; nor does water, oil, or gasoline. The fabric base laminates are hard, rigid materials, possessing greater strengths than the paper base. Tests on Panelyte 900 (flat with grain) give 12,200 lb. per sq. in. tensile strength, 40,000 lb. per sq. in. in compressive strength and 20,300 lb. per sq. in. in flexural strength. They are dimensionally stable and light in weight, approximately the same as the paper base laminates (½ that of aluminum). This factor makes their application

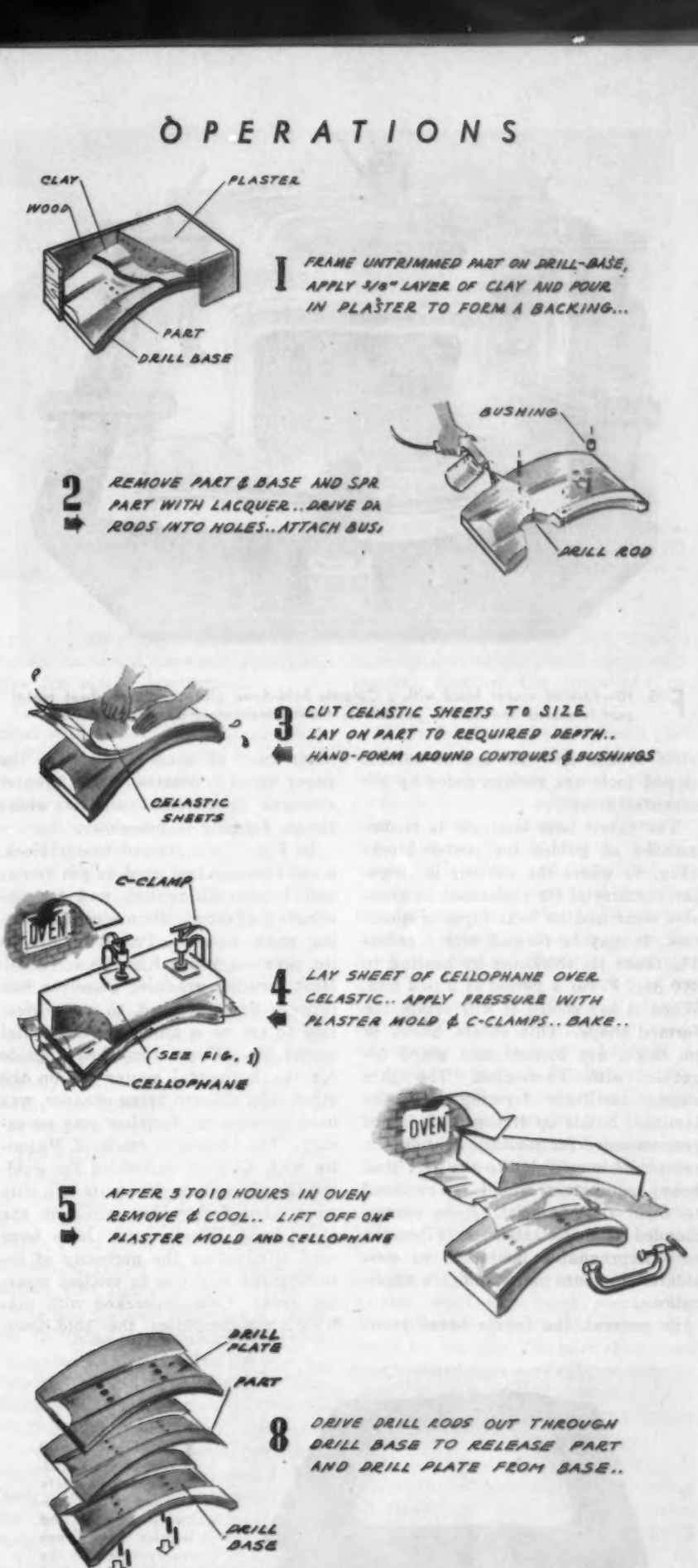
OPERATIONS
CLAY
PLASTER
WOOD
PART
DRILL BASE
1 FRAME UNTRIMMED PART ON DRILL-BASE, APPLY 3/8" LAYER OF CLAY AND POUR IN PLASTER TO FORM A BACKING...
BUSHING
2 REMOVE PART & BASE AND SPR PART WITH LACQUER.. DRIVE DA RODS INTO HOLES.. ATTACH BUS
DRILL ROD
CELASTIC SHEETS
3 CUT CELASTIC SHEETS TO SIZE LAY ON PART TO REQUIRED DEPTH.. HAND-FORM AROUND CONTOURS & BUSHINGS
C-CLAMP
OVEN
(SEE FIG. 1)
CELLOPHANE
4 LAY SHEET OF CELLOPHANE OVER CELASTIC.. APPLY PRESSURE WITH PLASTER MOLD & C-CLAMPS.. BAKE..
OVEN
5 AFTER 3 TO 10 HOURS IN OVEN REMOVE & COOL.. LIFT OFF ONE PLASTER MOLD AND CELLOPHANE
DRILL PLATE
PART
8 DRIVE DRILL RODS OUT THROUGH DRILL BASE TO RELEASE PART AND DRILL PLATE FROM BASE..
DRILL BASE

Fig. 8—Steps in forming a drill plate of Celastic (fabric base colloid treated laminate).

to tooling desirable where applicable.

Machining qualities of the plastic laminates are good. They may be sheared, sawed, shaved, punched, milled, turned, drilled, reamed, tapped, or threaded, sanded and stamped. In machining, practically the same rules apply as in brass. Highest pos-

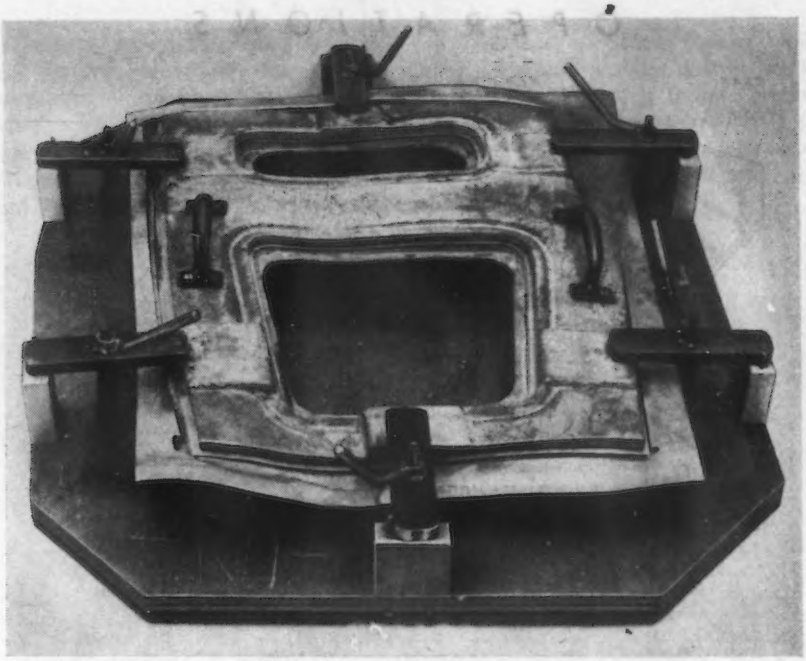

FIG. 10—Formed router block with a Celastic hold-down plate. Formed sheet metal part is nested and held in position as shown, and excess flange is trimmed.

sible speeds and the use of carbide tipped tools are recommended by the manufacturers.

The fabric base laminate is recommended as guides for router blocks (Fig. 6) where the contour is singular, because of its resistance to abrasive wear and its heat forming qualities. It may be formed with a radius 1½ times its thickness by heating to 400 deg. F. for a period of 2 to 4 min. When it has cooled it will retain the formed shape. Thin sheets, about ⅛ in. thick, are formed and glued together with Phenoglue. The thin sheets facilitate forming and the laminate builds up strength. It is not recommended for multiple contours or compound curves due to the fact that heavy equipment would be required to form the material. It is recommended that Celastic, or Fiberglas resin-impregnated laminates be considered in these more difficult applications.

In general, the fabric based laminates may be used in place of the paper based laminates, where greater strength is required and/or where simple forming is necessary.

In Fig. 7 is a formed router block, a combination tool used on pin router and horizontal router, and is constructed of wood, thermosetting casting resin, Celastic, Panelyte, Masonite, plywood, rolled Kirksite and steel. Heat forming grade of Panelyte was formed and attached to cylindrical side to act as a guide for horizontal router bit. Dilecto furnished a guide for the horizontal router bit on the other side. Dilecto being cheaper, was used because no forming was necessary. The bottom is made of Masonite with Kirksite embedded for guiding the pin router. Masonite will chip when used for guides, while on the other hand Dilecto could have been used eliminating the necessity of inserting the Kirksite in critical wearing areas. Celastic backed with mahogany comprises the hold-down.

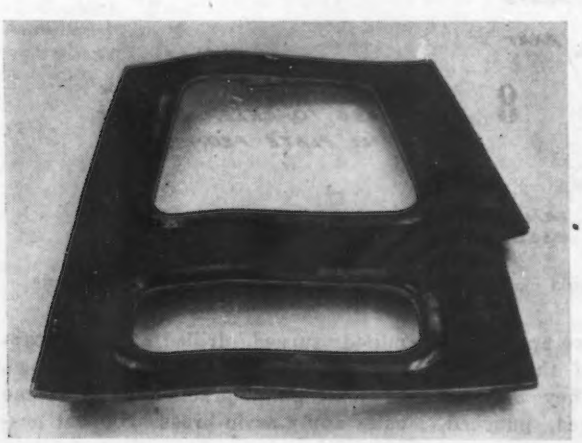

FIG. 11—The part side of the Celastic hold-down plate showing how precisely contours and joggles have been incorporated in the plate.

Since this tool was made, it has been discovered that Fiberglas laminate adapts itself to this type equally well and is less expensive to fabricate.

Here is featured the combinations of plastics to obtain light, quick, inexpensive tools. These plastics made possible the fabrication of a tool, which when used in conjunction with the routers, opened a new and faster method of trimming the part shown. Previously the part was hand trimmed with an overpress template used as a pattern. The part is now trimmed complete on this one tool.

Celastic

Celastic is the trade name of a colloid treated fabric; the composition is cotton flannel impregnated with a mixture of Pyroxlin and a fire retardant. Pyroxylin is a trade name of cellulose nitrate in a solvent such as ether. The treated fabric is semi-stiff like cardboard and resembles heavy blotter paper in appearance.

When a solvent is applied, such as ethylacetate, or any Pyroxlin solvent, this fabric becomes soft and pliable, and may be shaped quickly and easily to any contour. In as little as 25 min., but preferably overnight, it will gain rigidity if the Pyroxylin solvents are used. The solvent evaporates leaving the Celastic in the formed shape. Using a special covert solvent developed by Lockheed it will gain rigidity in 3 to 10 hr. of oven curing at 170 deg. F. The latter solvent polymerizes rather than evaporating thus adding strength to the Celastic. (Also, shrinkage, which occurs when other solvents are used, is practically eliminated. This factor is of paramount importance in building certain types of tools, for example, drill plates.)

Celastic adheres to any material including metal. Cellophane and/or a covert lacquer are used as parting mediums, these materials stick to Celastic but do not adhere to other materials.

Laminating requires the simple operations of submerging the sheets in the solvent and laying successive sheets one upon another until the desired thickness is obtained. Metal bushings, hinges, etc., may be fitted in their respective positions during the operation.

Slight pressure, by convenient means, are applied and then the laminate is baked to polymerize the solvent as previously mentioned. When cured, it is impossible to delaminate and edges do not chip.

The material is hard and rigid, light weight (one-seventh the weight of steel) and has very good strength qualities. The co-efficient of thermal

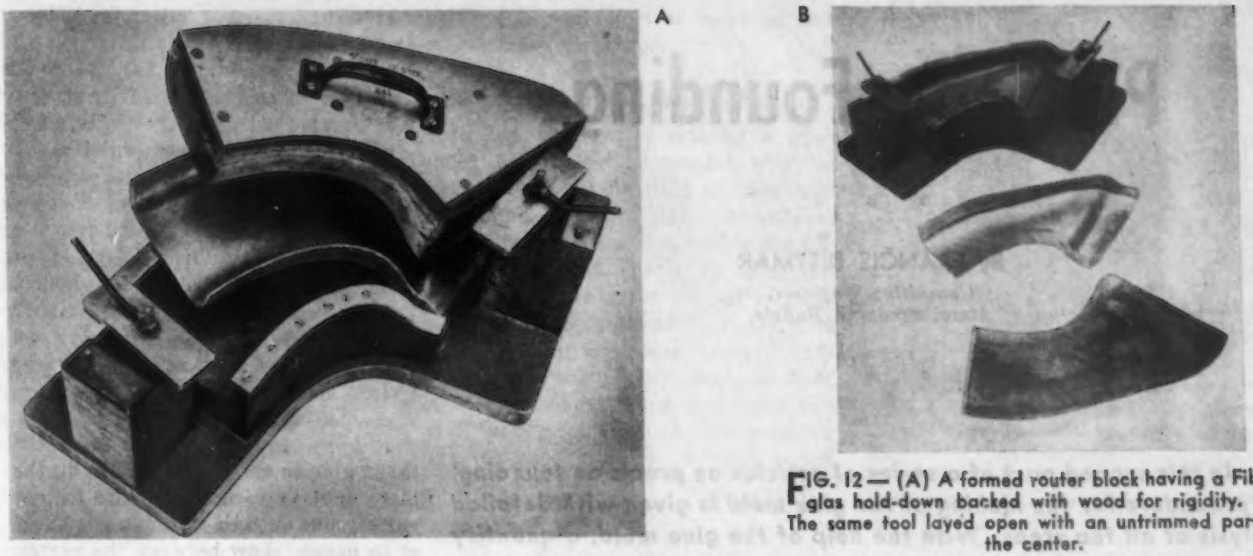

FIG. 12 — (A) A formed router block having a Fiberglas hold-down backed with wood for rigidity. (B) The same tool layed open with an untrimmed part in the center.

expansion nearly parallels that of aluminum. Initial shrinkage and after-shrinkage are practically nil. Oil and water have no effect on it, but the common solvents do. Virgin sheet Celastic may be cut like cloth with ordinary scissors or tin snips. Laminated Celastic has very good machining qualities, it may be sawed, drilled, filed, tapped, etc., and lightly sanded.

Operations performed in making a drill plate are explained in Fig. 8. These operations are basic and the operations are similar for all applications which are to date, hold-down plates and drill plates or cages. Fig. 9 shows a portable drill jig with hinges, bushings and pins embedded in Celastic layers.

An example of a tool in production use is the formed router block, Fig. 10. It consists of a wooden nest block with phenolic face, Celastic hold-down plate, plywood base, Dilecto bottom guide plate, steel and maple wood accessories. The Celastic hold-down plate (Fig. 11) weighs only one-seventh as much as a steel hold-down of the same size. It follows the contours of the part perfectly, whereas a steel hold-down would only contact the part in spots, due to the difficulty to heat, form, and weld steel to contours with an exacting fit. The Celastic plate holds the part more perfectly and is less likely to scratch the sheet metal parts.

The fabricating department estimated that less than one-half the manhours were expended in making the Celastic hold-down than that required to make a conventional steel hold-down.

Glass Base Laminates

Fiberglas is a trade name of glass manufactured in fiber or filament form and woven into cloth which has proven to be an excellent structural base for plastic laminates.

To laminate the cloth, it is impregnated with a cast phenolic resin, such as Baker's casting resin, and baked to harden the phenolic.

The cloth will not shrink, stretch, or swell with moisture changes, since each of the fibers is a tiny glass rod, without cellular interstructure. Subsequently, when impregnated with Lockheed's formula of Baker's casting resin which has a shrinkage inhibitor included, no shrinkage or swelling takes place.

The resin impregnated cloth may be shaped to any contour. When the phenolic is cured, the laminate is slightly flexible; however, it may be made rigid by using a backing material such as wood where practical.

The applications of this low pressure laminate at its present developmental stage has been limited to hold-down fixtures for formed router blocks, hand form blocks, combination horizontal router blocks, scribe jigs, shaper saw jigs and drill plates.

The applications may be very similar to those of Celastic. However, Fiberglas is slightly flexible whereas Celastic is rigid. Fiberglas or Celastic should replace steel almost exclusively for hold-down fixtures used in conjunction with tools containing contours and being manually handled; because of more perfect nesting qualities and because of lesser weight.

In the initial stages of development, the outstanding advantages of Fiberglas over that of Celastic is the simplicity of operations required to build up a laminate. Although the methods will vary with different types of tools, the method used for making a hold-down fixture reinforced with a wood backing for rigidity, will serve as a general view of the operations required.

In brief, a formed sheet metal part is lacquered to prevent resin from adhering. A rough wood backing block is shaped to approximate contour of part. Layers of Fiberglas cloth are cut to size, brush impregnated with resin, and laminated on backing block, forming and pressing out trapped air bubbles with gloved hands. The part is then placed on the block and pressed firmly to assure a good fit. The whole is placed in an oven and baked at 170 deg. F., for at least 3 hr. After removing from oven, accessories, etc., are attached and it is ready for use. A detailed description of operations appears in the second part of this article.

In Fig. 12 is shown a formed router block with a Fiberglas hold-down. The tool is used as a combination horizontal router block and scribe jig. It consists of a wood nest block faced with thermosetting casting resin, plywood base, rolled Kirksite router bit guides, steel and wood accessories. Fiberglas hold-down backed with wood for rigidity. The part shown has been routed and scribe lines may be seen on each end of the part. The ends of the hold-down serve to guide the scribe.

The fabricating department estimated that it took only five manhours to make the complete hold-down. Parts of this type were conventionally hand trimmed with the aid of an overpress template.

[In a succeeding article, a detailed series of operations are described for incorporating these thermoplastic casting materials in the construction of tools.]

Precision Founding

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. . . In this second part of a series of articles on precision founding, the procedure for the making of the glue mold is given with detailed analysis of all the steps. With the help of the glue mold, a quantity of try patterns can be made which will be utilized to establish the exact dimensions of the master pattern.

THE second step toward casting, centrifugally, a 3-in. ring in yellow brass will be to make a number of try patterns so that the exact dimensions of a master pattern may be established. From the master pattern, in turn, is made the master matrix in either rubber or in some rubber substitute. Into this master matrix is then poured or forced molten wax, thus reproducing, exact in every respect, the master pattern.

In practice it is advisable to make up as many try patterns as is readily convenient, in the present example a couple of dozen or so ought to do. The try patterns are duplications of the wooden pattern discussed in the first part of this article and that duplication is achieved by means of some gelatinous substance, such as horn glue.

The handling of plaster as mentioned in this present chapter is to be regarded as suitable only for comparatively rough work. For, it is absolutely essential, admitting of no neglect, to understand thoroughly the correct handling of plaster insofar as this applies to the production of precision castings.

Under conditions of mass production a special room and equipment for the preliminary work in precision founding would, as a matter of course, be necessary. Such conditions, however, will here be disregarded since it is the specific purpose of this work to deal with basic materials and with simple equipment whenever practicable. Commercial compounds and manufactured equipment are not only expensive but are often quite unnecessary. The baking oven and the furnace, such as will be discussed in parts VII and IX respectively, are examples of the simple equipment that will enable a foundry to make a start in this type of founding at low cost.

The process of making a glue mold is the same whether the mold is made from horn glue or from a moulange. It also resembles the process of making a master matrix so long as the matrix is to be made in some flexible material like rubber.

Horn glue is sold in the plate or flake form, either being all right for this use. The glue is usually melted in a galvanized bucket which fits loosely into another of larger size so that the glue can be run down into a waterbath, as in the case of the ordinary gluepot. Of course for so small a job as the 3-in. pattern under consideration, no large amount of glue would be needed, but since in precision founding glue molds are wanted right along it is best to have a lot of glue in the softer state because less time is needed for remelting. Glue loses none of its qualities in remelting and as long as it is stored in a reasonably dry and cool place it will last a long time. Glue is not defective which after prolonged storing develops mold. Used glue molds should be scrubbed with soap and water and put back into the gluebucket. When another mold is wanted, cut it up into about 1-in. square pieces and remelt all glue without further addition of water until its actual consistency has been ascertained.

Glue Melting Procedure

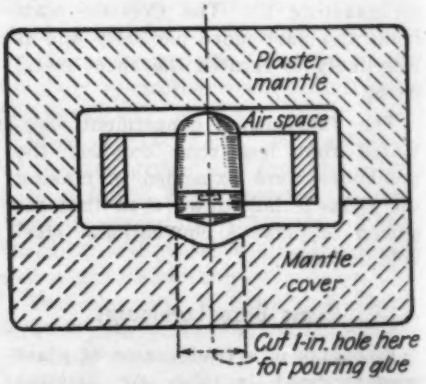
To melt glue not previously used, soak it in cold water overnight. Assume, for example, that there are 10 lb. of glue in the bucket, either in the plate or flake form. If of the former variety put enough water in the bucket to barely show between the plates, and if it is flaked glue the volume of water should be a little less than half of that of the flakes.

For precision work, the life of a glue mold is limited to several days. When not in use it must be kept damp by wrapping its shell "mantle" in damp sacking. This mantle is a plaster covering holding the glue mold in shape and the mold must not be taken out of its mantle except for working purposes.

It will lead to a more thorough and readier understanding of what follows if here, at the outset, the ring pattern is imagined to be entirely surrounded by a shell of plaster. This plaster shell would be the mantle of the glue mold. The mantle, however, does not touch the pattern anywhere, but clears it by 5/16 in. all around. It is into this air space that the molten glue is poured. See Fig. 4.

In order to produce such an air space the pattern is covered with a layer of clay, in the present case 5/16

FIG. 4—The glue mold is formed in the air space shown in the drawing. This space was the result of first covering the wooden pattern with a layer of clay, building the plaster "mantle" around the clay and then removing the clay.



in. thick, and the plaster mantle is built around this clay. When the plaster has set, the mantle is opened and the pattern taken out. After removing the clay covering, the pattern is put back into the mantle and held there by whatever locating points may have been provided—in this case, by the tapered pin. Glue is now poured into the space that was occupied by the clay.

This work ought to be done on a smooth modeling board about 3 x 2 ft., properly leveled and braced in back to prevent warping. It should be shellacked so that plaster, glue or wax will not stick to it, and when not in use it is best to have it hang. The abuse of equipment common in foundries is not to be tolerated in an establishment set up for precision founding.

Ordinary clay may be used so long as it's not too wet or dirty; however, for practical purposes it is best to use plastecine. Plastecine is a trade name for dried clay and glycerine or some such bonding agent, and may be purchased in foundry supply houses.

To make plastecine, raw clay is placed in a tub of water and the mixture is stirred thoroughly and then allowed to set for 48 hr. The top layer of water is then syphoned off which will be surprisingly clear by this time. The layer of clay held in suspension beneath the clear water layer will be of a thin cream-like consistency. This is scooped into buckets, taking care not to roil the precipitated muck and sand at the bottom. To dry this clay in a hurry spatter it onto layers of old newspapers which will quickly ab-

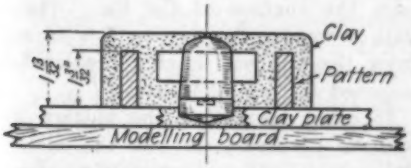


FIG. 5—Cross-section of the pattern and the clay covering which is used to form air space to be filled later with glue.

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sorb most of the water content. The clay in this form will now be ready for use for modeling or for making glue molds. To make plastecine, however, the clay must be dried in an oven at low heat. When completely dry reduce the clay to a powder and work into this powder, on the modeling board, enough glycerine or vaseline or a heavy oil to obtain a stiff putty. The stuff will keep indefinitely, will not harden and is always ready for use. Water-bonded clays have to be kept in some sort of humidor and so are a lot of bother.

Equipment for Glue Molds

In the process of making a glue mold a parting compound will be needed; the composition of this will be found in Part III. Additional equipment consists of a rolling pin for rolling out flat sheets of clay, an enamelware basin for plaster mixing, plaster of the grade of U. S. Gypsum Co. Moulding Hydrocal, a small paddle to mix the plaster, some shellac, a little powdered alum and some talcum powder. Vaseline for greasing the mold will also be required and it

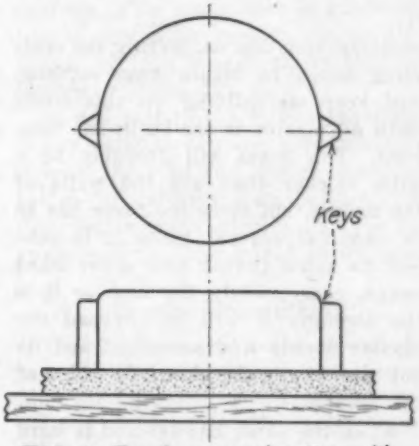

FIG. 6—The clay covered pattern with keys which are to serve as locating points for the glue mold.

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is well to grease the hands with vaseline before handling plaster.

Roll out a hunk of clay on the modeling board until it is flat and smooth and about 5/16 in. thick, forming a plate about a foot square. This is for covering the pattern all over. In order to prevent the clay from sticking the pattern should be wrapped with strips of oiled tissue paper. When the pattern is protected in this fashion it will save time afterwards when glue is poured around it; a perfectly clean pattern is necessary in order to get a faithful reproduction of all its details.

Gently press the pattern down on the 5/16 in. thick clay plate, with gates downward, central hub sticking up. See Fig. 5. Then cut a strip of clay and cover the sides of the gates with it. Since the gates are only ⅛ in. high while the strips are 5/16 in. wide, care must be taken not to dent these rather delicate strips with finger pressures. When all sides have been covered, cover the topside of each gate also, then cover the inner periphery of the ring except, of course, on that small part where the gates join since

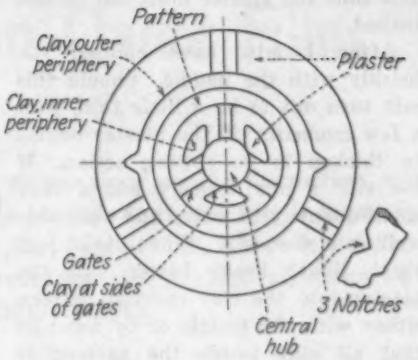

FIG. 7—Plan view of clay covered pattern with plaster mantle. The three notches form the locating points for the mantle cover.

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that part of th periphery cannot be reached now. Fillet the clay nicely at the sides and at the top of the gates onto the clay covering the inner periphery. Then cover the outer periphery of the pattern and finally the upper face of the ring, as shown in Fig. 5.

The clay covering should be uniformly 5/16 in. thick. All joints must be smooth and all edges slightly rounded. The central hub is to remain free from clay except of course where the gates join it. Give that central hub a coating of parting compound.

Now stick onto the outer periphery of the clay ring two V-shaped keys of clay, 180 deg. apart, that is, opposite each other, as shown in Fig. 6. These two keys are to act as locating points for the glue mold where it fits into its mantle. The keys need not be more than ½ in. wide at their base, the angle is unimportant, but their length is governed by the height of the clay pattern, about 1⅜ in. in this example.

Give the clay covering a coat of shellac and when this has dried grease it with vaseline. In order that the vaseline may flow evenly warm its container in hot water.

Rough Plaster Work

The following procedure is suitable only for rough plaster work. For correct manipulation of plaster see Part III.

Pour about a quart of clear cold water into the basin and *sprinkle* into it enough plaster of the Moulding Hydrocal grade until the plaster mound rising from the basin bottom sticks its top about ½ in. out of the water.

Without touching the basin wait 4 full min. Time this with a watch. It takes about that interval for this grade of plaster to begin its chemical reaction with the water and during

this time the plaster must not be disturbed.

After 4 min. have elapsed stir briskly with the paddle. Should this mix turn out to be a little thin, wait a few moments till the plaster begins to thicken in its setting action. If too stiff a mix, quickly add a very small quantity of water and work this well into the mix. When it is just right, like a heavy batter, slap the plaster into the clay covered pattern either with the paddle or by hand so that all clay inside the pattern is covered. Lift the modeling board at one end and gently jar it against the bench so that the plaster will settle soundly all over. It is necessary to work fast since the plaster is setting all the time. Slap more plaster into the pattern, and again jar the modeling board. Quickly dump the remainder of the plaster over the entire pattern, cover its upper face and sweep it around the outer periphery, keys and all. Empty the basin, scraping it out, and smoothen the plaster mound with the paddle until there is a roughly cylindrical, flat-topped mass with its side and top about an inch thick.

During the time this grade of plaster sets, about 15 min., wash all tools and equipment used. On returning, with hands chilled from the washing, feel the plaster mantle. If it has begun to warm up its setting action is nearly completed. When it is hard enough to handle, about 15 min. after making the mantle, roll it over. What meets the eye is shown in Fig. 7.

Now cover the remaining surfaces of the gates, the central hub and pattern with a 5/16 in. thick layer of clay, but do not cover the plaster segments between the gates nor the outer 1 in. wide plaster rim of the mantle. Press down the clay with a flattened stick of wood so that it joins the two clay rings surrounding the pattern and also joins the clay walls of the gates. When this is done give this clay a coat of shellac, and grease with vaseline.

Then cut into the exposed outer rim of the mantle three V-shaped notches about ½ in. wide at their base and about ⅜ in. deep (see Fig. 7). These three notches will form the locating points for the mantle cover, now about to be made. Shellac this outer plaster rim as well as all exposed plaster surfaces and when the shellac has hardened give these surfaces a sound coating of parting compound.

Mantle Cover

Mix up another batch of plaster, a little more than half as much as the first time and following the same directions, slap this on, jarring the modeling board to insure even settling, and keep on building up this cover until all plaster in the basin has been used. This mass will probably be a little thicker than are the walls of the mantle, but since the cover has to be removed several times it is subject to some prying and other hard usage, consequently the heavier it is the stronger it will be. Spread the plaster evenly and smoothly and do not allow it to slop down the sides of the mantle.

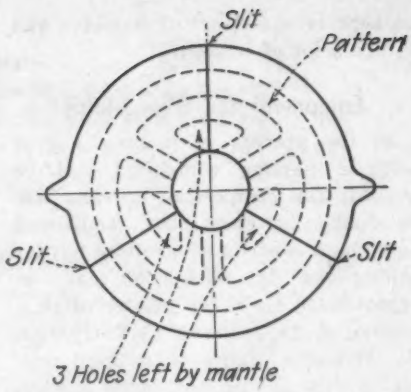

FIG. 8—To remove the wooden pattern, the glue mold is slit as shown.

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When the cover has set and is hard enough to handle, proceed to pry it off, inserting the edge of a knife—not the point—now here, now there, in the joint between mantle and cover. When it is loose, lift it off. It will be noted that on this cover there are now three V-shaped keys which will insure the cover's proper position when it is replaced on the mantle.

Remove all clay from the surface of the pattern and dig out the clay between pattern and mantle, taking care not to injure the slender gates. When most of the clay has been removed, gently lift the pattern out. The pattern will come out quite easily because it was wrapped in oiled paper and its tapered hub was kept from sticking by the parting compound.

After cleaning out all clay from the mantle give the inside surface a coat of shellac, then grease that surface with a warm, thin coat of vaseline.

Through the circular indentation left by the clay covering of the central hub cut a 1 in. hole (see Fig. 4). This will be the sprue hole for glue pouring. Shellac the inside surface of the cover, including the sprue hole, and grease with vaseline.

Remove the oiled paper from the pattern, wipe it clean without depriving it of the slight oil coating lest hot glue stick to it. Put the pattern back into the mantle, the tapered central hub first, pushing the hub gently into its hole. Then put the cover on and lash mantle and cover together with a length of cord. This last procedure is a little primitive, but to date no other satisfactory method has been discovered. The completed mantle is now ready for pouring.

Pouring the Glue

In the meantime the glue bucket has been put on the heating apparatus. When the glue has melted so that it is free running and without lumps, it is poured into the mantle through the sprue hole. If a funnel-shaped ring of clay has been put around the sprue hole this will prevent spilling. Pouring should be gentle since there are no vents at all in the mantle and air will have to escape through the sprue hole.

It takes about 12 hr. for the glue to stiffen and it is standard practice to pour glue molds along in the afternoon so they will be ready for curing in the morning.

After this time remove the cover, which should come off quite readily, and take the glue mold out of its mantle. The mold will be found to be a firm yet resilient dark brown mass with two V-shaped keys on its periphery which located it exactly in its mantle. This exact locating is important. Unevenness in mantle and cover will, because of the mold's pliability, cause distortion when the mold is not put back in precisely the position in which it was poured.

Cut off the sprue and with a needle probe for the big end of the central hub. When the hub is located cut a round hole directly over it, laying bare the surface of the hub. Then with a woodscrew given a few turns draw the hub out, having previously loosened it from the gates.

In order to remove the pattern it will be necessary to slit the mold. Glue molds and master matrixes are slit according to their various requirements and no general rule can be laid down for this. In the example of this ring pattern the mold is to be slit at the gate end (see Fig. 8). Locate the gates by probing and with a razor blade cut three slits radiating away from the hole already cut for the removal of the hub. When slit, the three triangular flaps are sprung back and the pattern is lifted out. When the flaps are released the slits can barely be seen.

The glue mold is now ready for "curing." This consists of dusting the inner surface with powdered alum. The alum is brushed over the entire surface with a camel hair brush and

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Formation and Structure of Iron Oxide Films

. . . The use of X ray reflection to throw light on the formation and crystal structure of iron oxide films reveals that this film is made up of three layers, FeO, Fe_3O_4 and Fe_2O_3. This article, which is a translation from the Russian, also discusses the crystal structure of nickel and cobalt oxides.

AN investigation of the formation and structure of oxide films on ferrous and other metals by using X ray reflection was recently conducted by V. I. Arkharov et al. and the results published in four papers in the Russian *Journal of Technical Physics*, No. 14, pp. 132-161, 1944.

The oxidation of ferrous metals takes place mainly as a result of diffusion of oxygen from the atmosphere towards the metal surface and of metal atoms and ions toward the air space. Since the iron oxides have a larger volume than the metal in them, the oxide film is not too porous and the movement of air into cracks of the film may be neglected.[1] When the oxide film forms in air at any temperature between 1058 deg. and 2417 deg. F., it consists of three layers: Fe_2O_3 on the outside, Fe_3O_4 in the middle and FeO next to the metal.

Arkharov studied first of all the formation and structure of the FeO layer. When this layer is sufficiently thick, such as produced by heating for 17 hr. at 2102 deg. F., it can be easily broken into two layers which in turn can be separated, although less easily, from the Fe_3O_4 layer and the metal.

The crystal spacing at the boundary of Fe_3O_4 and FeO is 4.2774 A°; at the internal face of the external FeO layer, 4.2808 A°; at the external face of the internal FeO layer, 4.2878 A°, and at the FeO-Fe boundary, 4.3108 A° (1 A° = 0.00000001 cm.) Jette and Foote[2] found some time ago that the crystal spacing of FeO increased when the percentage of oxygen in it decreased, and from the density of the specimen they concluded that the increased percentage of oxygen was due not to incorporation of additional oxygen into the normal FeO lattice but to absence of some Fe ions from their lattice places. The FeO phase contains holes, and the more holes there are, the smaller is the crystal spacing. Hence, as the spacing increases from the Fe_3O_4 boundary to the metal boundary of the FeO film, the film contains more holes (unoccupied seats of iron ions) the nearer the Fe_3O_4 layer is approached. That gives an insight into the growth of the oxide film. The concentration of iron ions near the metal surface is greater than is the concentration farther from the surface. This concentration gradient, like in any other system, causes diffusion of iron ions towards the air boundary of the film.

In addition to the lattice spacings, X ray patterns can also give information on the kind and degree of orientation of microcrystals within the film. Arkharov's results in this respect may be summarized as follows:

Crystal Orientation

The Fe_3O_4 layer near the Fe_2O_3 layer has no very definite orientation but the degree of orientation increases in time so that older Fe_3O_4 crystals, that is those farther from the air boundary, have a distinct preferred orientation, the cube face being parallel to the film surface. The cubes of FeO near the Fe_3O_4 layer are oriented in the same way, but the orientation becomes indistinct near the metal surface. This observation allows another conclusion to be drawn in elucidating the formation of the FeO layer. Near the metal surface but within the metal, the concentration of iron ions is so high that all oxygen atoms penetrating into the metal can find a partner. FeO crystals form here from iron crystals and, like the crystals from which they originate, have no preferred orientation.

Iron ions diffusing towards the air through the holes reduce the Fe_3O_4 at its internal boundary thus forming more FeO. These FeO cubes formed from well oriented Fe_3O_4 cubes also are well oriented. The cohesion between oriented and non-oriented FeO layers is poor, thus accounting for the easy splitting of the FeO film.

Arkharov observed earlier[3] that the overall oxidation of iron increases in speed after a well defined FeO layer has been built up. In the absence of a FeO layer, there is a high energetic barrier between the Fe metal and Fe_3O_4 which reduces the rate of diffusion. When an intermediate layer of FeO is present, two low barriers are substituted for one high one, and diffusion is made much easier.

Nickel and Cobalt Oxide Films

Oxidation of nickel in air at, say 2282 deg. F., produces a film consisting of NiO only. The spacing of this oxide is 4.1699 A° at the external face and 4.1681 A° at the internal face of the film. Here, therefore, the variation of the spacing across the film is small (18 A° against 336 A° for FeO) and in the opposite direction to that in FeO. Apparently the NiO phase contains almost no holes and the higher spacing near the film-air interface seems to be due to incorporation of some oxygen atoms into the NiO lattice. This oxygen diffuses toward the metal in the vicinity of which the oxygen concentration is low and forms NiO crystals at the metal surface. In this way the nickel oxide film grows only from the metal side whereas the ferrous oxide is built up along its two faces.

This explanation is confirmed by determination of the orientation of microcrystals. There is no preferred orientation near the metal where nickel oxide crystals are formed in a crowded condition between two solids, but the older strata, that is those near the air-film interface, have had time for recrystallization and have acquired a texture. In this case the cubes are inclined to the film surface at an angle of 10 deg.

The rate of oxidation of nickel is less than that of iron since the gradient of spacing across the oxide film is smaller. As mentioned above, this gradient is due to a concentration gradient which is the cause of diffusion. The examples of iron, nickel and cobalt, which behaves rather similarly to nickel, seem to point to an important rule: The oxidation of a metal in air proceeds the more rapidly, the steeper is the spacing gradient within the oxide film.

(CONTINUED ON PAGE 138)

[1] *Pilling and Bedworth, J. Inst. Metals*, 29, 529, 1923.

[2] *Metals Technology, AIME, Vol.* 105, *P.* 276.

[3] *Russian Journal of Technical Physics*, 4, 372, 1934; 11, 833, 1941.

Influence of Overaging

AT Northrop Aircraft, Inc., Hawthorne, Calif., tests have been conducted on high strength aluminum alloy sheet to determine the effects of overaging on physical and corrosion inhibiting properties.

Standard ASTM tensile specimens were cut in the direction of rolling from 0.040 in. thick sheets of the following material:

75 S-T Alclad As received condition
61 S-W As received condition
61 S-T As received condition

24S-T80 Alclad: 24S-O Alclad sheet given a solution heat treat at 920 deg. ±10 deg. F., then an elevated temperature precipitation treatment (375 deg. F., ±50 deg. for 10 hr.)

24S-T81 Alclad: 24S-T Alclad sheet given an elevated temperature preciptation treatment (375 deg. ±5 deg. F. for 10 hr.)

24S-T86 Alclad: 24-R T Alclad sheet given an elevated temperature precipitation treatment (375 deg. ±5 deg. F. for 5½ hr.)

These test specimens were heated for 24 hr. at aging temperatures of 250 deg., 375 deg. and 450 deg. F. Test specimens from each lot of these alloys were also overaged at 375 deg. F. for 100, 200, 400, 600 and 1000 hr.

After receiving this treatment, one-half of the specimens were subjected to an accelerated corrosion test according to the Army-Navy specification AN-QQ-H-186a, as follows:

Specimens were immersed for 1

TABLE I

Effect of Aging Aluminum Alloys for 24 Hr. at Various Temperatures

Alloy	Condition		Control	Temperature, Deg. F. 250	375	450
75S-T	Uncorroded	Yield—lb./sq. in.	74,350	74,030	46,200	28,220
		Ultimate—lb./sq. in.	81,550	80,990	60,370	44,430
		Elongation—Per cent in 2 in.	12.8	12.0	9.7	10.2
	Corroded		74,470	72,630	44,600	27,370
			81,100	79,800	58,500	43,270
			12.3	10.8	10.7	10.0
		Type of corrosion	Pitted corrosion of cladding.	Pitted corrosion of cladding.	Pitted corrosion of cladding.	Undermining pitting corrosion of cladding.
61S-W	Uncorroded		23,980	28,890	38,200	32,330
			38,690	42,390	42,230	37,270
			23.3	22.3	10.7	8.5
	Corroded		23,620	26,800	38,270	30,700
			38,470	40,330	41,970	38,620
			23.3	19.0	11.5	10.5
		Type of corrosion	Undermining pitting corrosion of core.	Intergranular corrosion of core.	Pitting and intergranular corrosion of core.	Pitting corrosion and slight intergranular corrosion.
61S-T	Uncorroded		40,170	40,870	38,400	33,100
			44,970	45,350	42,430	37,800
			12.0	11.5	12.2	9.2
	Corroded		38,830	39,330	38,300	32,300
			43,370	43,730	42,300	37,730
			11.8	10.0	11.3	10.0
		Type of corrosion	Intergranular corrosion of core.	Pitting and intergranular corrosion of core.	Undermining pitting corrosion.	Pitting corrosion.
24S-T80	Uncorroded		54,100	53,100	47,500	36,530
			67,600	68,400	60,800	52,670
			12.3	12.0	8.2	6.8
	Corroded		47,200	52,670	46,070	35,425
			63,970	65,700	58,870	50,570
			10.2	6.5	6.0	6.0
		Type of corrosion	Pitting corrosion of cladding.	Pitting and slight intergranular corrosion.	Undermining pitting intergranular corrosion.	Undermining pitting corrosion.
24S-T81	Uncorroded		61,670	65,620	59,080	49,730
			67,030	71,000	65,920	60,030
			5.7	6.0	6.0	6.8
	Corroded		54,930	60,050	57,900	49,100
			57,430	63,920	63,075	58,070
			2.3	3.7	4.3	4.8
		Type of corrosion	Undermining pitting and intergranular corrosion.	Severe intergranular corrosion of core.	Undermining pitting and intergranular corrosion.	Undermining pitting.
24S-T86	Uncorroded		59,200	64,420	61,330	52,000
			67,230	70,330	68,750	62,830
			6.7	6.0	7.0	7.0
	Corroded		61,750	62,330	57,570	50,350
			65,080	66,580	62,730	58,830
			2.7	2.7	3.0	3.7
		Type of corrosion	Undermining pitting corrosion.	Undermining pitting and intergranular corrosion of cladding.	Undermining pitting corrosion.	Undermining pitting and intergranular corrosion.

All values of physical properties were averaged from three specimens.

on Aluminum alloys . . .

min. in an etching solution made up of 50 cc. concentrated HNO_3 (70 per cent), 5 cc. HF (48 per cent) and 945 cc. distilled water which was heated to a temperature of 203 deg. F. After etching, specimens were rinsed in distilled water and immersed for 1 min. in concentrated HNO_3 (70 per cent) at room temperature to remove any metallic copper that may have been deposited. Specimens were then rinsed in distilled water very thoroughly and allowed to dry. They were then immersed for 6 hr. in a freshly

(CONTINUED ON PAGE 140)

TABLE II

Mechanical Properties of High Strength Aluminum Alloy Sheet Subjected to Overaging at 375 Deg. F.

Alloy	Condition	Time at Temperature (Hr.)	Yield Lb./Sq. In.	Ultimate Lb./Sq. In.	Elongation % in 2 In.	Type of Corrosion
75S-T	Uncorroded	Control	74,350	81,550	12.6	
		100	33,000	48,700	10.5	
		200	28,630	44,530	10.7	
		400	26,680	43,030	10.3	
		600	26,170	43,030	10.8	
		1000	25,930	42,670	10.5	
	Corroded	Control	74,470	81,100	12.3	
		100	32,670	48,570	10.0	Pitting corrosion
		200	28,730	45,070	10.3	Pitting corrosion
		400	27,000	42,730	11.3	Pitting corrosion
		600	26,170	42,270	10.3	Pitting corrosion
		1000	25,500	41,570	10.0	Pitting corrosion
61S-W	Uncorroded	Control	23,980	38,690	23.3	
		100	35,730	40,370	10.3	
		200	34,170	38,900	11.5	
		400	33,980	38,830	10.0	
		600	34,430	39,400	10.6	
		1000	35,000	39,930	9.8	
	Corroded	Control	23,620	38,470	23.3	
		100	35,730	40,100	10.2	Undermining pitting and intergranular corrosion
		200	34,030	38,830	10.3	Undermining pitting and intergranular corrosion
		400	33,370	38,100	9.5	Undermining pitting and intergranular corrosion
		600	34,030	38,700	9.8	Pitting corrosion
		1000	34,200	38,800	9.7	Intergranular and undermining corrosion
61S-T	Uncorroded	Control	40,170	44,970	12.0	
		100	36,100	40,830	9.7	
		200	34,930	39,650	11.5	
		400	34,670	39,230	10.0	
		600	34,170	39,170	10.8	
		1000	35,130	40,070	10.0	
	Corroded	Control	38,830	43,370	11.8	
		100	36,430	40,770	9.7	Intergranular and undermining pitting corrosion
		200	35,000	39,330	9.5	Pitting and intergranular corrosion
		400	33,500	38,060	9.3	Intergranular and undermining pitting corrosion
		600	34,430	39,200	9.5	Undermining pitting and intergranular corrosion
		1000	33,730	38,330	9.5	Intergranular and undermining pitting corrosion
24S-T80	Uncorroded	Control	54,100	67,900	12.3	
		100	37,070	51,900	7.2	
		200	37,080	52,100	8.7	
		400	36,130	51,570	7.5	
		600	38,200	52,750	7.3	
		1000	37,630	53,670	7.5	
	Corroded	Control	47,200	63,970	10.2	
		100	39,100	52,800	5.7	Undermining pitting corrosion
		200	36,970	50,500	5.2	Undermining pitting corrosion
		400	35,230	49,330	5.2	Undermining pitting corrosion
		600	37,670	52,200	5.5	Undermining pitting corrosion
		1000	37,430	51,770	5.5	Undermining pitting corrosion
24S-T81	Uncorroded	Control	61,670	67,030	5.7	
		100	55,870	64,630	6.3	
		200	52,400	61,830	7.7	
		400	49,400	61,070	7.3	
		600	51,500	61,830	7.7	
		1000	51,370	62,300	6.5	
	Corroded	Control	54,930	57,430	2.3	
		100	54,630	62,030	4.3	Undermining pitting corrosion
		200	52,600	60,530	3.7	Undermining pitting corrosion
		400	50,270	58,870	4.3	Undermining pitting corrosion
		600	50,530	58,430	3.7	Undermining pitting corrosion
		1000	49,900	58,470	4.2	Undermining pitting corrosion
24S-T86	Uncorroded	Control	59,200	67,230	6.7	
		100	57,900	67,080	7.0	
		200	54,530	65,030	8.3	
		400	50,030	61,670	7.8	
		600	51,000	62,400	8.3	
		1000	50,930	61,330	7.5	
	Corroded	Control	61,750	65,080	2.7	
		100	55,670	63,830	4.7	Undermining pitting corrosion
		200	53,530	61,170	3.3	Undermining pitting corrosion
		400	50,570	59,330	4.2	Undermining pitting corrosion
		600	50,580	59,500	4.0	Undermining pitting corrosion
		1000	49,770	57,600	3.3	Undermining pitting corrosion

All values of physical properties were averaged from three specimens.

. . . Magnetic Holddown Chucks

By CYRIL PROVO HUBERT
Chief Loftsman, California Shipbuilding Corp., Terminal Island, Calif.

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ONE of the most controversial phases of welding lightweight flat steel plating concerns the problem of distortion control. In this connection, studies made at California Shipbuilding Corp. to effectively and efficiently ease this condition indicated that there was but one constructive approach to the problem, namely the application of the principles of magnetism in the form of magnetic chucks for plate holding.

A system was developed for continuous duty on production lines whereby a number of magnetic units could be arranged and operated together under a single control to take care of automatic submerged melt welding operations on large sized subassemblies. The type of magnetic chuck shown in use in Fig. 1 has become one of the most important mediums for plate securement during the process of fabrication that characterizes superstructure construction in shipyards. The primary function of these custom-built electromagnets is to secure plating in way of seams in precise contact with an alined copper backup bar or chill plate deemed essential to gain facility and weld metal refinement during automatic welding operations.

Initial Experimentation

One of the most interesting things about the magnetic chuck is the procedure through which its design was evolved. In its conception, the principle is of course a modification of the industrial lifting magnet. Since it was a pioneering venture with no clear and obvious precedent for guidance, as an initial step, circular lifting magnets were first used in conducting a number of experiments. Chief technical interest centered in the problem of overcoming possible magnetic interference with the electric arc. Investigation determined that the method of lining up a series of magnets in a single line formation with inserted backup bar positioned as shown at *A* in Fig. 2 was illogical. The unworkability of the setup was not that the fields opposed each other but was traceable to the disturbance of weld deposit in the magnetic field due to magnetic interference when welding across the facing of the inner and outer pole shoes of the magnets. In a followup study, diagrammed at *B* in Fig. 2, it was found that by placing a number of properly polarized magnetic units in two rows with the copper backup bar positioned between the rows in such a manner that the magnetic units are kept 1 in. away from the line of welding, the plates could be held together and welded without interference from the magnetic field.

While this pattern served as a proving ground, the chief criticism of the use of circular electromagnets was the loss of field between magnets due to their circularity. Hence as a part of the studies the next step was to provide rectangular holddown magnets designed to introduce magnetic attraction throughout the entire length of the plating. These rectangular magnets were designed on the "consequent poles" principle.

Looking at the matter from a purely academic viewpoint, Fig. 3, illustrating consequent poles, is helpful in obtaining a basic picture of the magnetic field surrounding a bar of steel. Writing in the publication "Principles of Magnaflux Inspection," F. B. Doane, vice-president, Magnaflux Corp., states:

> *"It is possible for more than two poles to exist simultaneously in a magnetized piece of steel. For, there may be two north poles and only one south pole in a bar of steel, as shown in Fig. 3, or vice versa, or perhaps a series of multiple poles may be formed along the length of a slim bar magnet. Such an occurrence is called "Consequent Poles."*

Fig. 4 shows diagrammatically how the consequent pole principle was incorporated in electromagnet designs for welding chucks, while Fig. 5 illustrates the arrangement of six chucks on a magnetic skid assembly. The parallel plate holding magnets shown linked together in combination are

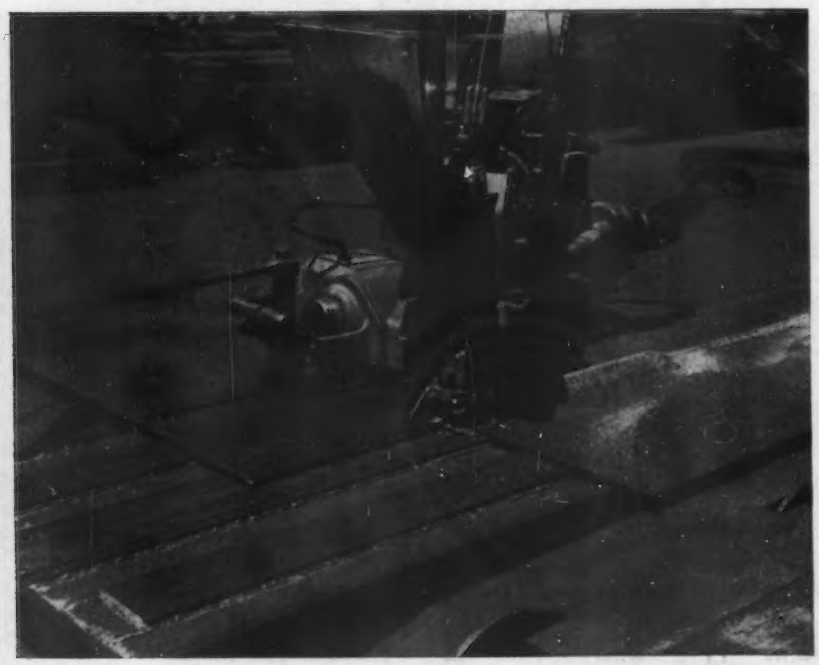

FIG. 1—A representative illustration of the modernized techniques of magnetic plate securement during automatic submerged melt welding operations.

Facilitate Plate Welding . . .

. . . Custom built electromagnetic chucks play a key part in the Unionmelt automatic welding of light plate from 5/16 to ⅜ in. in thickness at California Shipbuilding Corp. Through use of "consequent poles" principle and proper spacing of magnets with respect to weld seam, effect of magnetic flux on the arc is avoided.

built in units 5 ft. long by 10 in. wide and 6 in. deep. Two parallel rows consisting of three magnets each, placed end to end, comprise a tandem assembly, the rows being separated by ¼ x 3 in. copper backup bar. The ¾ in. high-carbon steel plate frame structure or magnetic body constitutes a heavy steel casement of welded construction, rugged enough to withstand sledge hammer blows when it becomes necessary to straighten a crimped edge or to assist in flattening a bulged plate.

The frame structure which supports the magnets and other operating elements comprises a wide flange I-beam and wing brackets so arranged that the self-contained magnets are held in definite relation to each other so as to form a compact assembly. Movement of the assembly vertically is accomplished by two pneumatic cylinders, raising and lowering the magnets by remote control, so that the plates may rest flatly and evenly on them. For clarity of presentation, a cross-section of the assembly is given in Fig. 6.

The magnets are energized by power from a common electric welding generator and provision is made for full magnetic strength over the complete face of the magnets, with uniform flux density throughout. The magnetic assemblies have necessary cable connections and are equipped with one switch to demagnetize all six units simultaneously by putting a small reverse current through them, thus instantly disengaging the plates. Each unit is complete in itself and wound for use on 60 volt direct current and to utilize 1000 watts per section.

The chucks have a tractive power of 125 lb. per sq. in. of magnet section and are capable of continuous operation under a maximum temperature of 35 deg. C. for sustained efficiency. The magnetic attraction exerts a tremendous downpull, holding the plates in exact position for welding. On heavy structural plate the total pull exerted by each magnet may be as high as 12,000 lb. On light weight plate, it is somewhat reduced, but still much stronger than is required to keep the contact surface of the plates in close union with the backup bar.

When plates of less than 3/16 in. thickness are welded on the chucks, it becomes necessary to place a magnetic plate on top of each side of the work to eliminate stray magnetic field. These levelers take out any unevenness of the steel. This procedure is also applicable for holding down

FIG. 2—Circular magnet arrangements used in conducting preliminary investigations.

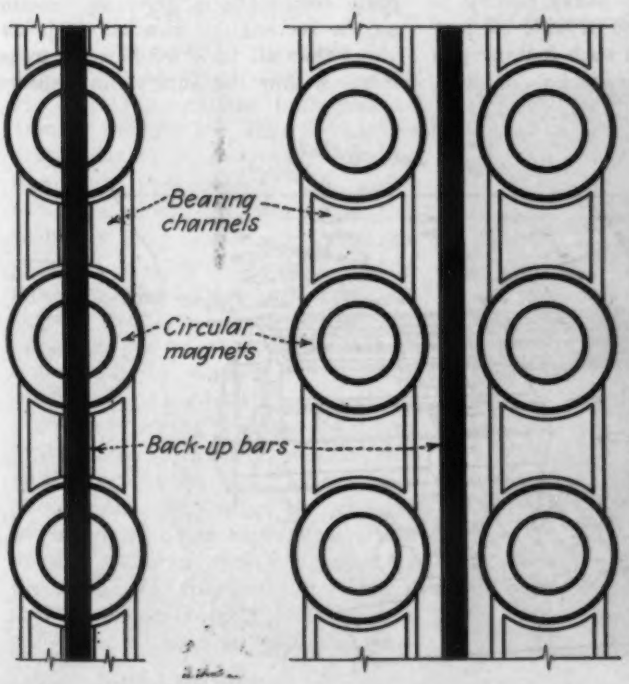

FIG. 3—Principle of "consequent poles."

Photo courtesy Magnaflux Corp.

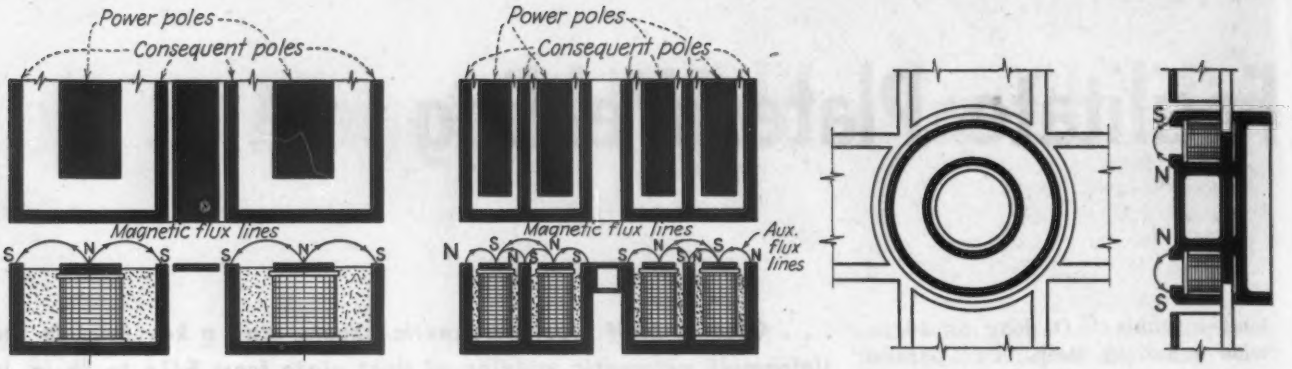

FIG. 4—Use of consequent poles principle in both rectangular and circular electromagnet construction.

non-magnetic steels and non-ferrous sheets.

The top of the magnet where the plates rest is machined to perfect flatness. The chuck face is divided into magnetic poles separated by non-magnetic stainless steel and the polarity of the magnets is kept with like poles on each side of the copper backup bar so as not to affect the arc during welding of the plate seams. Proper functioning of the magnets requires an extremely close fit of the cover, for unless the units are perfectly watertight, atmospheric moisture will induce short circuits and corrosion. Consequently, the non-magnetic cover is welded to the outer and inner magnet poles, forming a positive barrier against moisture.

Coil windings are made of insulated magnetic wire of high thermal conductivity wound on accurately machined spools and positioned so as to avoid slippage. These windings are impregnated with a high temperature insulating compound to assure the removal of moisture and prevent excessive heat from affecting magnet efficiency. The contact surfaces of the spools are likewise insulated with a baked-on high-dielectric enamel coating.

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As a further precaution, in order to safeguard against the dangers of condensed moisture, it is preferable to have a high temperature special elastic impregnating compound forced, under high pressure, into the magnets.

Copper Backup Bar

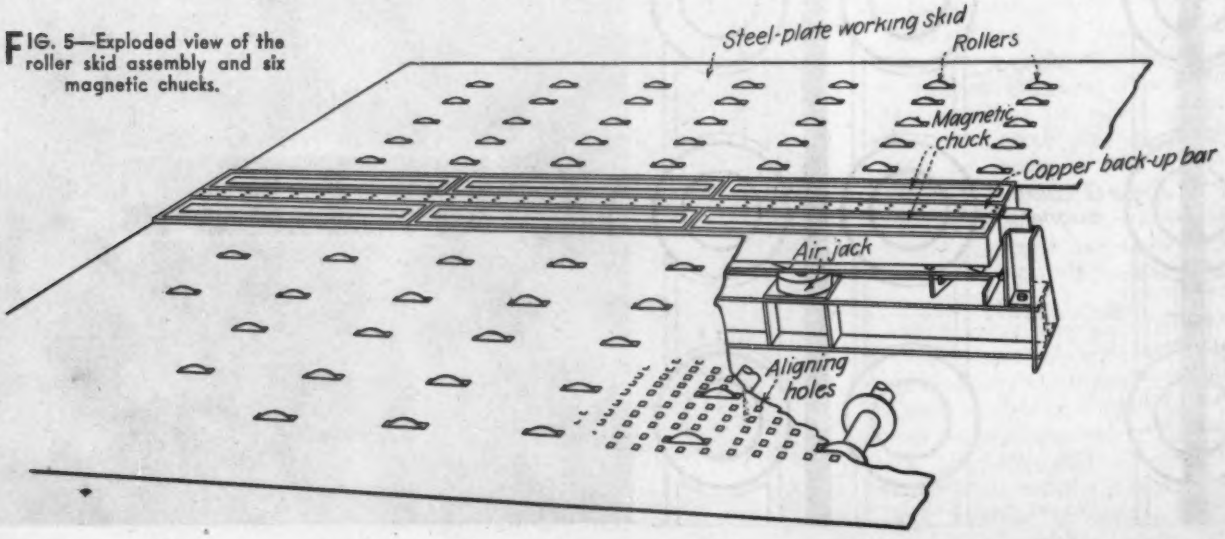
The immediate obective of the mechanically polished pure copper backup division strip is to provide a smooth contact at the backs of the plates, preventing leak through and magnetic flux interference, and assuring a good clean weld bead. The expensive incidental operation of back-chipping is eliminated and beveling of plates up to ⅝ in. in thickness is unnecessary. A high production rate is achieved along with a saving in electrode material and power.

Should welding operations be broadened to include heavy plating, it becomes necessary to provide efficient heat dissipation. In such instances, a copper-coated water jacket of 2-in. square steel tubing is used in lieu of the copper backup bar. A carefully controlled flow of water circulated through the jacket reduces the temperature, increases welding quality and efficiency. Since the copper bars eventually show wear by pitting, countersunk slotted holes are provided in the bars for bar securement and to facilitate replacement.

Fig. 7 shows the general layout of the skids, with two magnetic chucks arranged for automatic welding and one T-shaped chuck for tack welding. This latter chuck, incorporating circular magnets is pictured in Fig. 8. All small miscellaneous bulkheads are welded on these magnetic skids. Heretofore, this work was scattered over several areas in the yard. The present method centralizes the work, the transportation of material and that of supervision.

As an interesting sidelight, attention is directed to the success achieved by utilizing the experimental circular magnets mounted in T-formation on air jacks as a magnetic holddown jig for tack welding plate combinations prior to welding on the rectangular chucks. It is obvious that all tack welds have to be made within the intervening spaces

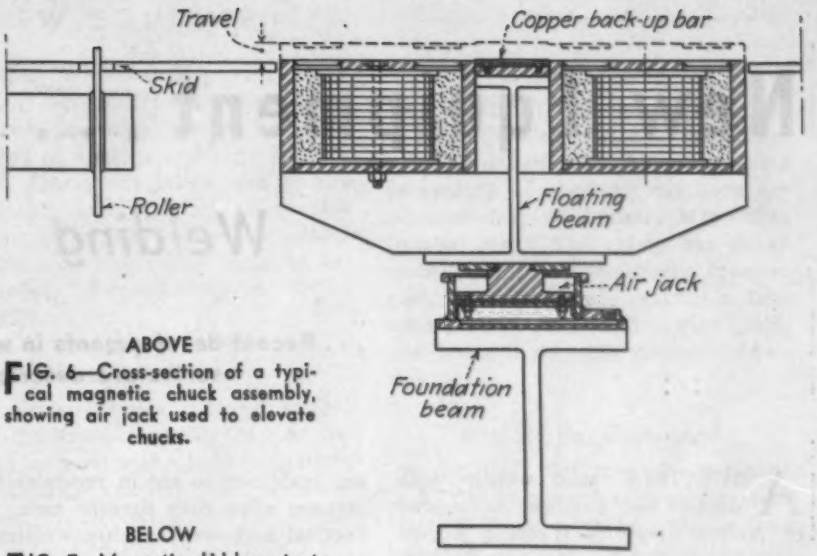
FIG. 5—Exploded view of the roller skid assembly and six magnetic chucks.



between the magnets, as noted, to avoid interference from the magnetic field.

Experience under production conditions indicates that for plating having square-butt joints, welded both sides, a turnover rig could be advantageously employed for positioning the plating to permit the finishing pass to be made on the opposite side of joint.

In summarizing, it is fair to assume that, with industry looking for every possible new idea that can be used advantageously in peacetime manufacture, magnetic chucking will unquestionably fit harmoniously into the pattern of postwar industrial productivity. Indeed, it will simplify processing in many piecetime operations and will be a strong competitive weapon in the hand of the cost-conscious operator. In fact a new dimension has been brought to welding. This realization is reflected in the current interest now being evidenced in the magnetic chuck field. The tangible values inherent in this newly acquired technique in speeding up production as well as improving the economy of production becomes evident upon reviewing the following factual backgrounds and figures indicative of Calship's findings.

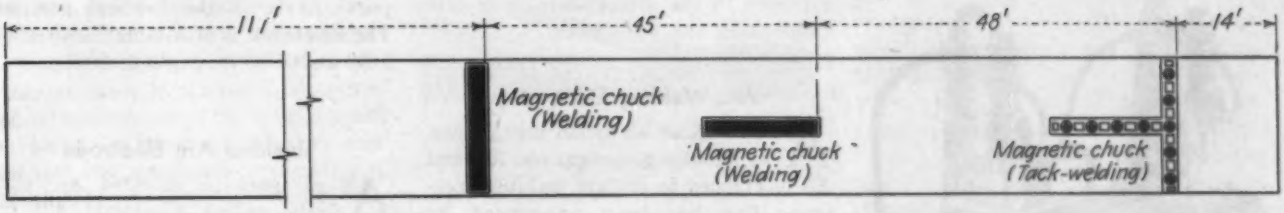


ABOVE

FIG. 6—Cross-section of a typical magnetic chuck assembly, showing air jack used to elevate chucks.

BELOW

FIG. 7—Magnetic skid layout at Calship.



Cost Reduction

These sub-assembly magnetic skids, new to any shipyard, were pioneered by Calship to relieve high cost of manual welding and have become the very heart of superstructure production since thousands of thin superstructure plates are welded in this fashion. They stand out as a fine example of the advantage to be gained by bold departure from accepted practice. Drumheading the light plating by tack welding it to platens or by dogging down plate edges and strong-backing to hold the plates fair during welding operations is dispensed with. Furthermore, the local restraint furnished by the magnetic chucks minimizes the stresses set up by heat and mechanical action during welding, thereby combating distortion. By using automatic Unionmelt submerged melt welding machines in conjunction with the magnetic skids, monetary savings averaged $2665 per month, as compared with manual welding. Previously, to prepare and weld 33,280 ft. of plating seam required 5312 manhours at a cost of $6374.40.

Ingenuity in arriving at various solutions to the problems involved may be credited in large measure to C. W. Wintle, superintendent of Calship's Unionmelt welding department and his assistant, C. M. Caldwell, for bringing the plan to fruition. John Zuponcic, general superintendent of machine shop and electrical maintenance, was in charge of the experimental work. The magnetic chucks were designed by H. W. Enke and his crew of Unionmelt maintenance electricians with the assistance of the F. W. Shrader Co. and the H & H Mfg. Co., which companies are specialists in the field of electromagnet construction.

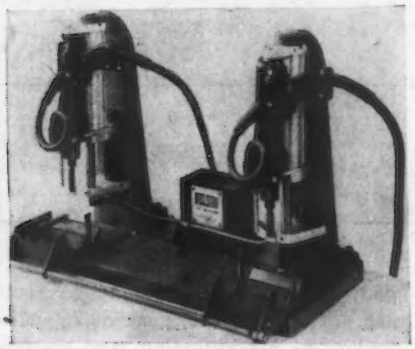
FIG. 8—Magnetic holddown jig for tack welding, using circular magnetic chucks spaced at intervals (see also Fig. 4, right).

New Equipment . . .

Welding

. . . Recent developments in welders, electrodes and welding accessories are described in the following pages.

A MULTIPLE stud welder production unit has been announced by *Nelson Specialty Welding Equipment Corp.*, 440 Peralta Avenue, San



Leandro, Calif. It welds two or more studs in one operation and the work is operated with a single control switch. The work is inserted, stud is fitted into the chuck of each stud welding gun and the control switch pressed. The first gun then descends making a weld. Upon completion of this weld, the next gun descends and welds. The gun then ascends automatically and the work is removed.

AC Arc Welder

A LINE of ac arc welding machines that replace their "plug in" models have been announced by *Ergolyte Mfg. Co.*, 367 North Lawrence Street, Philadelphia 40. Called Ergolyte Standard 161 and Standard 251, the principal feature of these machines is said to be the ease with which the whirlwind air cooling assembly and cyclone automatic arcing assembly can convert either one of the machines to specific welding needs.

All-Position Electrode

AN all-position ac electrode, known as the ACP, has been announced by *Westinghouse Electric & Mfg. Co.* The electrode includes an arc pacifier that prevents excessive spatter loss during the negative half cycles and an arc stabilizer to aid in reestablishing the arc after each current zero. For vertical and overhead arc welding, a high-organic electrode coating is used which provides an envelope of burning gas that keeps the oxygen and nitrogen in the atmosphere from contaminating the weld metal.

Arc Welding Electrodes

ADDITION of ac nickel manganese, ac Mo Mang manganese, X2, and X3 electrodes to its arc welding electrode line has been announced by *Allis-Chalmers Mfg. Co.*, Milwaukee. Characteristics of the weld deposit of the ac nickel manganese and the ac Mo Mang manganese allow it to work-harden to 550 brinell, according to the company. These electrodes are available in assorted sizes, both bare and coated, the coating being a combination suitable for both ac and dc welders. Hard surfacing electrodes X2 and X3 are used to protect parts subject to extensive wear, the X2 for severe abrasion and mild impact and the X3 for severe impact and mild abrasion. These electrodes are available in assorted sizes with combination ac and dc coating only.

Electrode

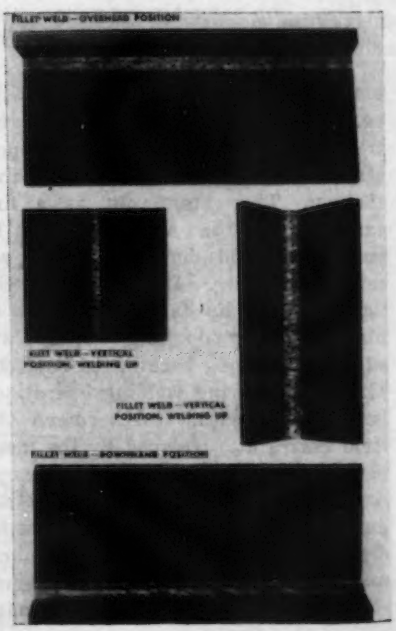
AN all position mild steel electrode for welding and repairing cast iron, called Harcast, has been announced by *Harnischfeger Corp.*, Milwaukee 14. The electrode can be used with either ac or dc machines, straight or reverse polarity on dc. It is said to work well at low amperage and to fuse well with either mild or medium carbon steel.

Arc Welding Electrode

AN arc welding electrode for low alloy, high tensile steels has been announced by *General Electric Co.*, Schenectady, N. Y. Known as Type W-56, the electrode operates on either ac or dc, reverse polarity and its range of current is sufficiently broad to cover a wide range of plate thicknesses. The electrode can be used in flat, vertical and overhead positions and produces a relatively flat deposit, particularly in the vertical position. The electrode is available in sizes ⅛, 5/32 and 3/16 in. in diameter.

Shielded Arc Electrode

AN all position shielded arc electrode, called Fleetweld 47, for general purpose welding of mild steel has been announced by *Lincoln Electric Co.*, Cleveland 1. The electrode can be used with either alternating or direct current and is especially well suited for making high speed horizontal or flat fillet welds over 4 in. long in which the coating can be dragged on both plates. It has also been used extensively for both vertical and overhead fillets especially where large single pass fillets are desired. The electrode is available in the following sizes: 5/32 x 14 in.,


FILLET WELD—OVERHEAD POSITION
FILLET WELD—VERTICAL POSITION, WELDING UP
FILLET WELD—VERTICAL POSITION, WELDING UP
FILLET WELD—HORIZONTAL POSITION

3/16 x 14 in., ¼ x 8 in. and 5/16 x 18 in. The electrodes are packed in 50-lb. containers.

Electrode Holder

AN armor-clad screw type fully insulated electrode holder has been announced by *General Electric Co.*, Schenectady, N. Y. A feature of the holder is its head which is completely enclosed in a sheath of aluminum armor which is said to protect the insulation, resist weld spatter and eliminate the possibility of accidental contact with the welding circuit. Designed to accommodate electrodes up to and include ¼ in. in diameter, the holder weighs 15 oz. and is said to be unusually cool in operation. A slight twist of the hand tightens or releases the electrode. The width of the electrode slot limits the size of the electrode which can be inserted preventing overloading.

Alloy Electrode

AN electrode for welding jet propulsion engines has been announced by *Arcos Corp.*, 1515 Locust Street, Philadelphia 2. The electrode is said to produce a weld metal that withstands the great temperatures and stresses encountered in jet propulsion engines.

High Temperature Electrode

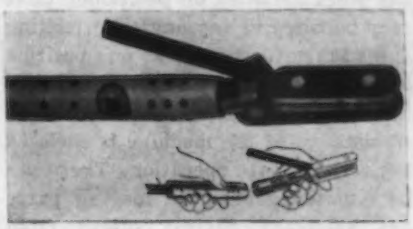
AN alloy electrode, Chromend 9-M, for high temperature corrosion resistance work giving 8 to 10 pct chrome and 1.5 pct moly weld deposit has been announced by *Arcos Corp.*, 1515 Locust Street, Philadelphia 2. Chromend 9-M bridges the gap between Chromend 5-M, a 4-6 pct chrome-molybdenum electrode and Chromend 12, a 12 pct chrome-molybdenum electrode.

Electrode Holder

A LIGHT WEIGHT screw type electrode holder, said to be one-third lighter than corresponding size clamp type holder has been announced by *Allis-Chalmers Mfg. Co.*, Milwaukee. Exposed metal surfaces of the new electrode holder are constructed of spatter resistant Mallory metal. Heavy insulation and handle ventilation are designed to provide cool operation. The holder is available in light and heavy-duty sizes to accommodate electrodes up to ⅜ in. diameter.

Electrode Holder

AN electrode holder designed so that the front assembly can be detached by hand without shutting down the welding machine has been developed by *Detroit Electrode Holder Mfg. Co.*, 2034 Forest Avenue, West, Detroit 8. The holder is of the re-



silient jaw type, fully insulated. It is said that removing or reattaching the front requires only 15 sec.

Welding Rod

THE addition of a machinable cast iron welding rod to its line of Arcaloy stainless steel and Tool-Arc tool steel electrodes has been announced by *Alloy Rods Co.*, York, Pa. The rod introduces Nickel-Arc which can be used on ac or dc current in all positions. No preheat is required to obtain porosity free deposits machinable in the weld deposit fusion zone. The weld deposit is free from cracks or cross checking in multiple pass welds.

Hard Facing Metal

A NON-FERROUS hard-facing metal has been developed by *Fansteel Metallurgical Corp.*, North Chicago, Ill. Called Fanweld, the metal is designed for acetylene torch application to steel and is said to possess marked resistance to abrasion, heat, impact and erosion. The steel contains tantalum-columbium carbide which imparts a self-lubricating action designed to minimize the destructive effects of friction even at high temperatures. Surfaces as thin as 0.010 in. can be applied with a fusion layer as thin as 0.0005 in. it is claimed. It is made in 3/16 and ¼ in. diameter rods in 14 in. lengths.

Ground Clamp

A GROUND clamp so designed that the current does not travel a great distance in the clamp thus preventing overheating has been announced by *Will-Weld Mfg. Co.*, Omaha, Neb. The clamp has sharp teeth which automatically remove rust, paint and scale making a firm solid ground. It is said to give quick, positive and portable ground connection.

Anti-Spatter Compound

A LIQUID designed to minimize the adherence of welding spatter to metal and reduce cleaning time has been announced by *Lincoln Electric Co.*, Cleveland, Ohio. Called "Non-Spatter" film, the liquid is said to possess the following characteristics: welding can proceed after application whether the film is still wet or dry, film can be sprayed or painted on work, priming coats of paint can be applied over the film, one application of film is effective for multiple-pass welding. The film is supplied in concentrated form in 5-gal. cans. By diluting the concentrated material in three parts of water, 20 gal. of film fluid is obtained.

Either brush or air gun can be used to apply the film to the areas adjacent to the joint to be welded and to welding jigs that may be subjected to spatter. After welding, the spatter can be easily removed by wiping or brushing.

Welders' Truck

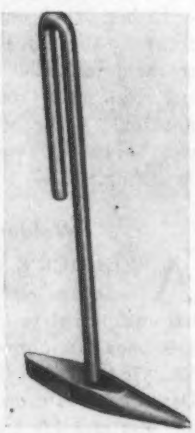
A WELDER'S truck for the acetylene gas welder who must take his equipment to the place of welding has been announced by *Palmer-Shile Co.*, 784 South Harrington Avenue, Detroit 17. Designed to accommodate one gas and one air cylinder, the truck is of all-metal, all-welded construc-

tion. Truck handles are equipped with a cross-bar on which Gasaver or torch hanger can be mounted. The overall height of the truck is 48 in., width 29 in.

Straight Edge

FOR use in the flame cutting of vertical and overhead, as well as horizontal surfaces, a magnetic straight edge has been announced by *B & W Co.*, 7610 South Figuerosa Street. Los Angeles 13, An 18 lb. pull holds the straight edge firmly to the work whether the plate is rusted, oily or painted. The straight edges are easily adjustable to any bevel angle. Bevels are cut in one operation. Three models are offered in lengths from 18 to 36 in.

Welders' Chipping Hammer



AN addition to its line of welders' chipping hammers has been announced by *Chicago Mfg. & Distributing Co.*, 1928 West 46th Street, Chicago 9. The handles are made of ⅜ in. round steel and have a special hand grip to absorb shock when chipping and to hook on the welders' belt when not in use. Type E hammer, illustrated, has a combination drift and chisel made for general chipping purposes. Type F is similar to Type E, except that the head has two chisels at right angles. Both types can be supplied with a removable wire brush which is fastened to the handle by special clamps and countersunk screw.

Welding Positioner

A multi-purpose welding positioner has been announced by *Standard Machinery Co.*, Providence, R. I., for rotating work up to 700 lb at speeds from 0 to 2.4 rpm in either direction by hand wheel control. The unit will accommodate table speeds up to 180 in. per min. with a work radius of 1 ft. Linear speeds at all radii are easily set and indicated on a scale located on side of frame. To obtain a desired welding speed the operator notes the approximate radius at which the welding is to be done and moves the control wheel until the indicator is opposite the desired welding speed in the scale column for that radius. For sequence or step welding the table may be positively started, stopped or reversed. The machine has proven adaptable for moving work past the torch and quench in flame hardening operations. The table can be removed easily and various jigs attached directly to the spindle. Also, the work mounted on positioner table may be tilted to any angle, permitting the worker to operate at one position and so facilitate the inspection of parts or assembly operations. The mechanism of the machine is enclosed entirely for safe operation. There are no exposed gears. All moving parts are protected against splash from molten weld rods.

Welding Shield Cover Glasses

COVER glasses for welding shields, treated with a protective coating to guard against heat breakage and damage from metal spatter, have been announced by *Industrial Products Co.*, 2820 N. Fourth Street, Philadelphia 33. The glasses are completely covered on both sides with a baked on protective coating which will not pit, peel or rub off.

Protective Jacket

A JACKET for welders, the Amcoweld Pro-Tecto-Cape, has been announced by *Eastern Equipment Co.*, Willow Grove, Pa. Made of high grade, durable chrome leather, incorporating underarm flaps and a collar which may be turned up, the jacket protects the wearer even when doing overhead welding. The collar is held in an upright position by means of special tabs and a snap fastener. A bib front is equipped with snap fasteners for easy removal.

Electrode Holder

DESIGNED to prevent slipping in the welder's mitt or glove when changing rods, an all-plastic, four-cornered collar has been included in its 300 amp. electrode holder according to an announcement by *Martin Wells*, Los Angeles. The collar is said to provide a positive grip on the insulator and to hold small rods upright and away from contact with work because the corners of collar keep the holder from rolling. The collar is said to remain cooler than the cap.

Safety Glove

A SAFETY glove made from chrome-tanned cowhide has been announced by *American Optical Co.*, Southbridge, Mass. Because of its one-piece back construction, there are no seams on the back of the glove to catch sparks or molten metal.

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STANLEY H. BRAMS

• The postwar Willys jeep demonstrates that it functions as truck, passenger car, tractor and farm power package; and as a jack-of-all trades it may find good markets . . . Auto sheets still are lacking.

TOLEDO—The postwar jeep of Willys-Overland Motors, Inc., a combination truck-tractor-power takeoff-passenger conveyance, was announced this week, second of the 1946 models to make its bow. To say the least, Willys has done a spectacular job in pioneering a new type of vehicle.

The civilian jeep looks quite a bit like its military counterpart, but is considerably more versatile. It adapts the basic jeep concept of power, weight, size, 4-wheel drive, dependability and ruggedness into a unit which seems to be about as all-purpose as anything which has yet emerged from the fertile proving grounds of the automobile industry. The new jeep is the basic unit in a family of other Willys vehicles in the low price range, on which production is now beginning and will be expanded as rapidly as quota limitations permit.

As a passenger car the new jeep is not much to look at. It differs from its military appearance in the front and rear tops which are provided, in cushioned seats, somewhat easier entrance and egress and other refinements. Improved springs and shock absorbers have been added and vision is improved. The gear shift lever has been moved to the steering post.

Mechanically the transmission gears have been widened and bearings have been enlarged. In the transfer case a special device has been placed between shift levers, making it necessary for the driver to utilize all four wheels when in low-low gear ratio, protecting the rear axle from overload and reducing tire wear. A new combustion chamber has been developed to increase power; a larger clutch has been installed; steering linkage has been redesigned to provide greater handling ease; and the chassis frame has been stiffened to absorb the load of heavy draw-bar work. The engine turns up 63 hp., and top speed is 60 mph.

Most interesting in the application of the jeep for general farm duty is its special power takeoff which can be used with the spline shaft for direct power or with the belt pulley, making it possible to delegate up to 30 hp. to anything from a buzz saw to a thrasher. In demonstrations held on the farm of Charles E. Sorensen, president of Willys, intrigued onlookers saw the power takeoff operating a paint sprayer, a buzz saw, a post hole digger and other farm equipment. A belt-driven governor is available and can be installed wherever constant engine speed, regardless of load, is needed; the governor operates from the instrument panel and permits regulated speeds from 1000 to 2600 rpm. in steps of 200 rpm. The power takeoff unit is driven by placing a transfer case gear shift lever in neutral position.

USED as a tractor the jeep appears to be able to do about everything except cultivate certain row crops for which the tread width of the car is not suitable, and others

AUTOMOTIVE CHAMELEON: *The new Willys postwar jeep changes its concept at a moment's notice. At left it is shown as a passenger car, with front and rear tops up, and front side panels in place. At right, with top down and windshield lowered, the jeep in foreground operates a thrashing machine through its power takeoff while at rear another vehicle stands ready to function as a truck as soon as the trailer is loaded.*

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Then there's the P&W literature, crammed with helpful ideas, suggestions, and plenty of information. You can go far toward solving your problems by making full use of these extensive catalogs and booklets on Pratt & Whitney's long list of machine tools, small tools, and gages. A letter from you will let us know what we can send that will help you most. Write us today.

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for which especially high clearance is needed. But the vehicle does do numerous other field tasks. In demonstrations it plowed, pulled a disc and harrow, baled straw, cultivated corn, operated a field pickup cutter and threshed wheat. In the field the jeep has a drawbar pull of 1200 lb., said to be conservatively arrived at to care for sudden ascents in grade, belts of hard clay cutting across otherwise soft soil, or fields made hard to plow by other conditions. Hard plowing equivalent to 10 years' work has been accomplished without failure, Willys engineers stated. On the highway, incidentally, the jeeps pulls a trail load of 5500 lb. with adequate reserve power for grades.

Used as a truck, the jeep is just as versatile as in its other applications. It proved itself by hauling a trailer load of hay, trucking live stock by utilizing a tail gate which lengthens the body sufficiently to enable it to operate as a pickup truck and in many other applications. Here, as in the other uses, the variety of task which the new Willys vehicle accomplishes is broad indeed.

Marketing will be through a strengthened distributor-dealer organization, on which franchises are now being granted at an accelerating rate. There appears no doubt but that Willys will have a reasonably good market for its product domestically, together with perhaps an even broader market overseas where all-purpose vehicles may find perhaps greater economic justification for themselves.

Other models will come along later, intended to widen the sphere of merchandising activity radiating out of Toledo. Meanwhile, there is little doubt but what the company will be in position to exceed the production totals of its average years since its reorganization thirties. The best volume year of Willys came in 1937, when 63,465 vehicles were produced, approximately 1.2 pct of the industry total of 5,013,867. Since then the company has absorbed an even smaller share of the market. With its unique new product, and with the manufacturing genius of Sorensen and the merchandising ability of board chairman Ward M. Canaday bolstering the company, the Toledo member of the automobile family may be in for improved times.

IN company with the other car companies, Willys is having a hard time getting steel for a start on its production. The general situation at Detroit is one of hopefulness that the indefinite weeks ahead will see the greater flow of steel promised by Washington, tempered with irritation that these show no immediate signs of being translated into deliveries from the mills.

To date no company seems able to have obtained more than a faint trickle of body sheet—by which is meant that here and there a firm has been able to get quick-term promises for 100 tons, or even considerably less. Such quantities will accomplish little more than die tryout and production of a handful of cars; but that will be enough to legitimatize announcements that production has started. Here and there companies have small stocks of prewar steel still lying in their bins, but none seems to have even the modest carryover which made it possible for Ford to get off to such a fast start.

In the meantime, orders to Detroit mill offices continue substantial, but they are fast turning from CMP business to unrated orders. One estimate is that this month's tonnage stands about 3-to-1 in favor of orders lacking priority.

The big ripples in current steel buying out of Detroit are the requirements of Chevrolet for production of upwards of 100,000 trucks, mainly on priority, during the balance of this year. Inquiries are still coming in for construction work, meanwhile; but most awards made thus far—as in the case of several General Motors units—have been held up because of lack of official authorizations from the government to get on with actual building.

SCRAP SALVAGE: *This oxy-acetylene torch cutting machine, built of scrap parts and powered by a windshield wiper motor, was devised by W. Deshler, Seaman, First Class (left), and W. Boehnke, Shipfitter, First Class, serving with the Navy Seabees in the Pacific. Hand-made wooden pulleys were substituted for unobtainable reduction gears; bearings were salvaged from wrecked aircraft; windshield wiper motor operates on battery power from electric welding machine.*

WPB Estimates 1945 Metal Requirements

Washington

• • • **Based on the assumption that war with Japan will continue during the remainder of the year, with consideration of the effects of anticipated revocations of orders and the extent to which substitute materials are being used, WPB has made estimates of the quantities of construction materials required in 1945. Steel requirements are placed at 2,692,000 tons compared with 2,067,000 net tons shipped in 1944. Of the 1945 total, 341,000 are plates, compared with 285,600 tons last year.**

Estimates in net tons for other metals are:

Cast iron	384,000	392,400
Copper	28,285	29,616
Lead	32,538	37,784
Zinc	8,934	10,370

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The plates on this truss are made from Carpenter Stainless #6 (Type 430) Strip supplied with our standard ABC finish. All that was necessary to secure a bright and gleaming surface was to blank and tumble these parts. Previously made from nickel plated non-ferrous metal they had to be blanked, polished, plated, final polished and buffed. Now instead of finishing each piece separately, job lots can be tumbled at one time, thus affording substantial savings in time and expense.

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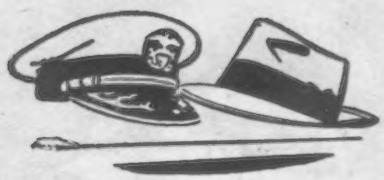
Washington . . .

L. W. MOFFETT

• WPB program to increase sheet and strip output to face tough sledding . . . Manpower to be factor in attempt to supply more sheets.



WASHINGTON — WPB's recently announced program to bring about increased production of steel sheet and strip may be faced with tough sledding.

Informed circles say this is particularly true of the projected plan to recruit 2000 additional workers for the production of an additional 240,000 tons of these flatrolled products in the third quarter.

This recruitment plan is closely tied in with the recognized need for the rebuilding of disbanded "teams" formerly employed in the sheet and strip mills. It is pointed out that when the mills were converted to the production of steel plate to meet the then critical need, these groups of skilled workers were either detailed to other departments or sought employment elsewhere.

WPB has notified steel producers that they should avail themselves of the WMC's facilities for inter-regional recruitment of those skilled and unskilled workers needed to sustain the production program. This has been made easier by the recent relaxation of the previous requirement that a certain percentage of a plant's production must have been devoted to war or essential civilian activities. Under the present procedure a plant need only certify that it is engaged in production for the Japanese war or essential civilian use in order to secure referrals on the inter-regional basis.

Confronting government manpower planners in their quest for particular types of workers are three barriers which must be dealt with if the recruitment program is to be effective within the desired time: (1) The disinclination of war workers who have been employed at a relatively higher wage to accept a job paying less; (2) the widespread practice on the part of returning servicemen and unemployed war workers to "take a vacation" rather than seeking a job right away and (3) the expressed opposition by some labor groups to the employment of foreign labor in the face of localized unemployment conditions. While Tahitians and Jamaicans have been employed with union consent in critical labor areas, some manpower officials feel that objections will be raised now that the war emergency is somewhat relaxed.

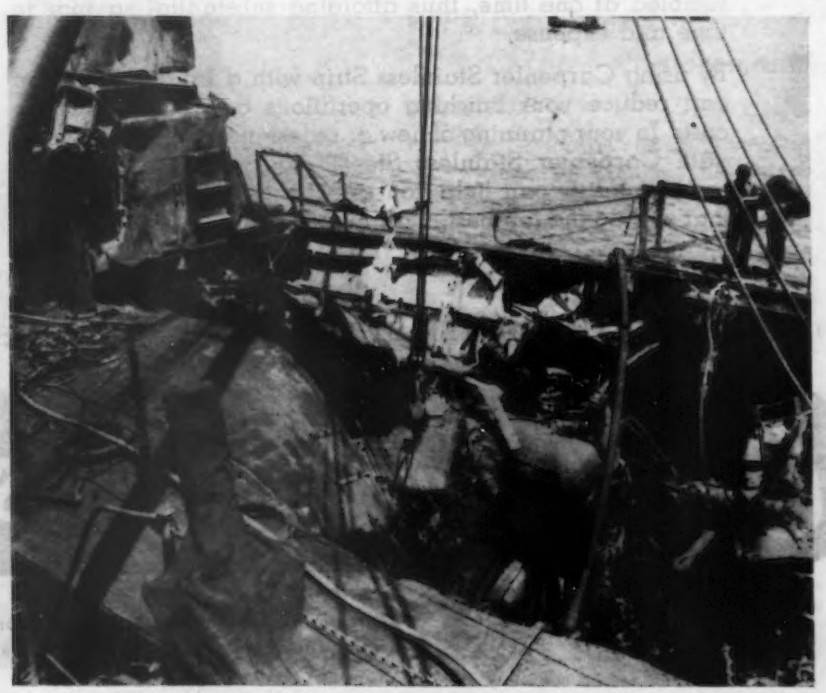
Percentagewise, WPB is expected to recommend cancellation or refuse renewal of approximately 30 pct of deferred workers in all age groups with special emphasis on those in the 26-29 age brackets.

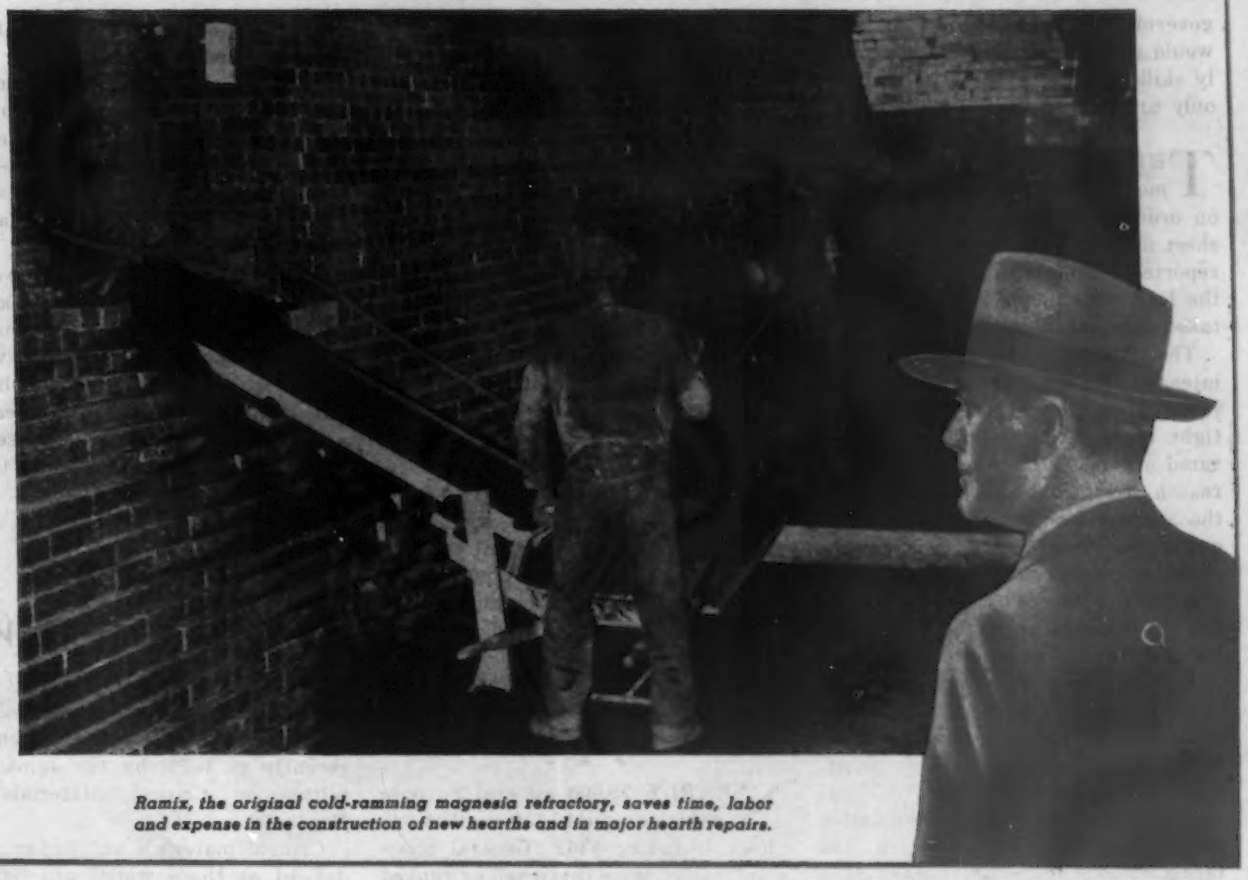
Selective Service calls in the next few weeks are expected to cut deeply into the ranks of deferred steel workers. Originally deferred to boost sagging production last winter, the below 29 age groups are expected to feel the brunt of deferment cancellations. This is in line with the plan to screen these registrants under recently tightened procedures designed to furnish 65,000 men by Aug. 1 and around 90,000 each month during September and October.

Earlier attempts by WPB to secure furloughs or outright discharges of needed steel workers from the Army having been turned down in spite of repeated efforts, there seems little basis for proceeding along those lines again. The steel industry will have to draw on labor made available through the discharge of veterans under the point system or look elsewhere.

It is not believed expedient by manpower authorities to seek deferment of steel workers engaged in civilian production for reconversion inasmuch as public opinion would not favor such a move. Recent tightening of rules

SUICIDE TARGET: *The fireroom of the destroyer Newcomb after an attack by seven Japanese suicide planes off southern Japan. The 2100-ton destroyer sustained four hits which practically disemboweled the ship. Temporary repairs by the crew enabled the ship to return to an advance base anchorage.*





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You can depend on the Basic Engineer because he is a practical steel man. He has made steel himself, spent years on open hearth and electric furnace floors. Now his duty is to make this training as a steel man and his knowledge of refractories available to you, his customer, to help you produce steel with minimum refractory trouble and at lowest refractory cost.

So just accentuate this point...the Basic man is YOUR Refractories Engineer. Don't hesitate to use his "know-how" and experience.

BASIC REFRACTORIES, INCORPORATED 845 HANNA BUILDING *Cleveland 15, Ohio*

governing deferments, it is said, would permit deferring the most highly skilled workers under 29 and then only under unusual circumstances.

* * *

THE recent action by WPB in removing the "freeze" restrictions on orders for specific types of steel sheet and strip for July and August reportedly came about as a result of the lead time factor not having been taken into consideration.

The "freeze" order of July 4 was intended to permit the placing of unrated orders for those particularly tight types of steel in the place of rated orders which were canceled by reason of contract cutbacks. However, the average lead time of 30 days required for these types of steel precluded any real control along the lines originally intended and necessitated the throwing open of the mill books for July and August orders.

Another move designed to make increased quantities of critical steel available to small business is expected to be announced shortly. This, in effect, would give priority to "Z-3" orders placed under Priority Regulation 27 over regular CMP orders in the filling of mill space left vacant as a result of rated order cancellations.

* * *

PRIORITIES Regulation 29, recently issued, may not prove to be a boon insofar as small business is concerned. This WPB regulation, designed to replace the AA rating pattern which has been in effect since the early part of the war emergency, will utilize a simplified rating plan for military and essential civilian items.

Contention is being made that the provision of the regulation which calls for discontinuance of the AA ratings after Oct. 1 for deliveries before the end of the year may prove detrimental. This handicap may arise, it is argued, because of the inability of smaller concerns to maintain adequate inventories into next year. Larger companies, it is claimed, will be able to operate sufficiently on the provisions of this regulation but the fate of the smaller enterprises is in doubt.

It has been suggested that this situation may be remedied by postponing elimination of the AA rating at least for another quarter. It is declared that this will enable smaller business to compete in the scramble for scarce materials and components during the tight reconversion period.

* * *

NEARLY 75,000 general purpose vehicles and 16,159 combat vehicles, including 4462 "General Sherman" tanks, were destroyed or junked in the campaign against Germany, according to figures just released by the Ordnance Department.

These figures include vehicles completely written off the books and not the thousands of vehicles that were repaired and salvaged.

The lowly jeep carried the brunt of the losses among the general purpose and combat vehicles. In the 11 months of battle, there were 25,781 jeeps destroyed through a variety of causes, including direct hits, mines, plane action and road accidents.

Next in number of losses was the 2½-ton general purpose truck with 19,664. Approximately 1500 medium tanks were lost. Half-track vehicle losses were 1964. Small amphibious cargo carriers, nicknamed "Weasels," sustained 1137 losses. Losses of "Ducks," 2½-ton amphibious trucks, reached 1005.

Critical Material List Revised And Submitted to WPB

Washington

• • • A revised list of critical materials and products was submitted recently to WPB by the Joint Committee on Critical Materials and Products.

Critical materials and products are defined as those which are now, or are expected to be, in short supply and which threaten to limit the production of essential products or the fulfillment of programs of high urgency.

Among items in the revised list are: Antimony; automotive type axles; metal bellows assemblies; conveyor belting; cadmium; railroad freight cars; power transmission chain; power cranes and shovels (crawler and truck mounted over ¾ cu yd capacity); compressed gas cylinders; steel drums and pails; air-cooled gasoline internal combustion engines (except aircraft propulsion); liquid-cooled diesel internal combustion engines (non-marine, over 750 rpm); and liquid cooled gasoline internal combustion engines (except aircraft propulsion film, X ray).

Underground mine locomotives; fractional hp electric motors; cast iron soil pipe; malleable iron pipe fittings and unions; metal insect screen cloth; steel, carbon and alloy sheet and strip; steel strapping; metal clad switchgear, including circuit breakers; tin; tracklaying tractors (Classes I and II only); power and distribution transformers; transmission, (automotive type only); industrial power, fork lift gasoline driven trucks; brass valves, 100 lb swp and over; and iron and steel lubricated plug valves.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

WHY, SURE YOU CAN HAVE YOUR JOB BACK, JOHNNY -- BUT WE SURE HATE TO LOSE YOUR WIFE -- SHE'S DONE MIGHTY FINE ON THAT DRILL PRESS!
THE WAR'S OVER FER JOHNNY, BUT LOTS OF HEROES ARE STILL GOIN' TO HAVE SKIRMISHES AT HOME WHEN THEY TRY TO TELL HOW HARD THEY WORKED ALL DAY!
I JIST HOPE IT DON'T GIT TO TH' POINT WHERE THEY ASK US TO STAY HOME AN' DO TH' WASHIN'!
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Time is saved on the assembly line because every part fits as it should — no subassemblies have to be torn down and reassembled. Salvage and rework time are practically eliminated. The completed product will be of higher quality, require less service and give more years of trouble-free performance.

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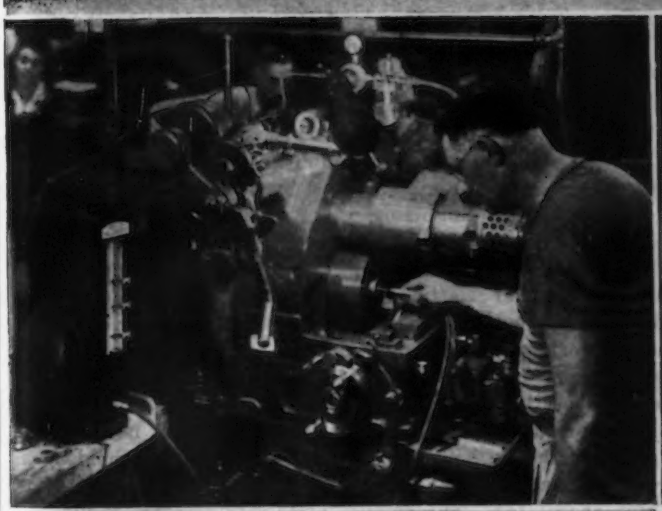

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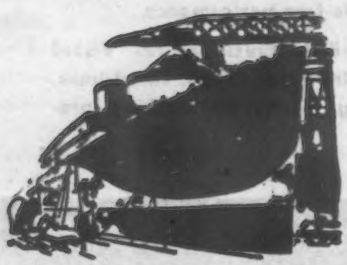
West Coast . . .

OSGOOD MURDOCK

• Col. Heller of Surplus Property Board urges West to form locally-owned independent corporation to buy Geneva mill and suggests Henry J. Kaiser as production manager . . . Sheet and lumber shortage nudge fabricators toward light metals.



SAN FRANCISCO—Colonel Edward H. Heller of the Federal Surplus Property Board proposed here last week the formation of a locally-financed western corporation for the purchase and operation of Geneva (and possibly Fontana), declaring that if Geneva is not bought by a western corporation it is perfectly possible that the government may consider closing it down. He brushed off a reference to the bid of a private steel corporation, adding that it is the policy of the board "to prefer offers which contemplate using a plant rather than shutting it down."

Col. Heller's proposal had the acquiescence of ex-Governor Robert A. Hurley of Connecticut, also member of the Surplus Property Board. It is their suggestion that if the people of the West are far-seeing enough to take advantage of what the government has done, the War Surplus Board will be glad to consider their proposal. He later added that the government would also consider putting in plant facilities for reconversion if the management could show sufficient operating capital.

"The government cannot listen to the woes of the coast," Col. Heller said. "Plants cannot be given to anyone. The coast must do something for itself. The board wants a proposal backed with cash. It is the policy of the board that plants be disposed of locally, rather than to large groups. If a western group does not buy Geneva, it is perfectly possible that it might be closed down."

Col. Hurley recommended that a stock-selling campaign be put on as soon as possible so that an offer could be backed up with "good hard cash."

Elaborating on his suggestion, Col. Heller thought that the corporation should be headed by a prominent western industrialist, naming Herbert Hoover or A. P. Giannini as suitable heads for the corporation and Henry J. Kaiser as operating manager.

From his Palo Alto home Herbert Hoover immediately declined in advance the possibility of his connection in the process of formation of such a company, saying that he was not interested. A. P. Giannini was absent from the city, leaving Henry Kaiser as only available runner-up.

Kaiser said that his companies would continue to explore all of the suggested possibilities, and that Col. Heller's suggestions were all "within the realm of reason."

Purchase or lease price for Geneva would be a matter for negotiation by the board of directors of the proposed corporation with the RFC and the Surplus Property Board, Col. Heller said, "I can't estimate the price, but everybody knows that the government won't get back the $200 millions put into Geneva." He added that he realized that Fontana was privately owned, and inclusion of its name in the discussion was purely speculative.

Heller and Hurley also speculated that the coast aluminum plants now producing for the airplane industry might be converted into steel fabricating plants and become part of an integrated western steel industry, and suggested that shipyards would make excellent automobile assembly plants. Airplane factories present a special problem, they said, with difficult conversion plans.

Kaiser, in commenting on his proposed management of the corporation, said that indicated steel consumption for the 16 western states was estimated at 5,700,000 tons a year and if the West had well diversified production facilities, total existing ingot capacity would be only 40 pct of the tonnage used and less than 5 pct of the national tonnage.

RECENT WPB order requiring metalworking firms to reduce their inventories to a 45 day-backlog finds West Coast industry clear of application, with only one firm to date known to be overstocked. However, WPB doesn't intend to be content with voluntary reports of over-supply of sheet and strip but will canvas industry shop by shop, in an effort to uncover and reallot material to those firms needing it most.

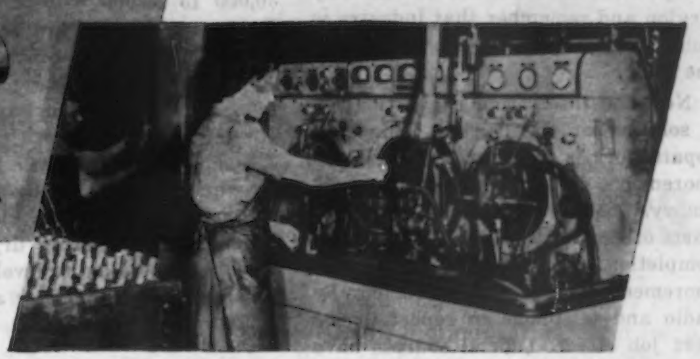
Local officials of the WPB, with a natural pride in the record of their regional proteges, are as puzzled as the rest of industry as to the immediate cause of current shortage. Recognizing that for all practical purposes the war is over for many eastern plants, they are inclined to attribute the shortage to backed-up demand in eastern mills in their effort to accumulate a sufficient supply of stock to schedule production runs, combined with current ordnance production. Neither demand for, nor supply of, sheet on the coast can hold a candle to the volume needed by the automobile and refrigerator industries. Sentiment in these parts seems to be of the, "Don't look at me, brother!" variety.

WHILE many ships still lie at anchor in the Bay, not one of them is held up for lack of repair workers. All are waiting for loading. The recent nautical traffic jam, generated from the intense punishment

JET IN ACTION: *The RAF Meteor, first jet propelled aircraft of the United Nations to go into action, carries four 20 mm cannon in the nose and is powered by two Welland or Derwent engines. Dimensions of the Meteor are: Span 43 ft, length 41 ft, height 13 ft and wing area 374 sq ft.*

Double-Barrelled SHORT-CUT

Briggs and Stratton tells how to cut costs ...improve quality with TOCCO



Part: Engine gear and shaft. Pitch diam. of gear 2", face 5/8". One of 18 parts which are hardened by Briggs & Stratton Corp. on one TOCCO machine.

Short-cut No. 1. Formerly hardened gear blank to machinable limit (32 R.C.) and cut teeth when hard . . . Now cut teeth in soft gear blank and TOCCO-harden teeth to 40-45 R.C. . . . Results: Gear-cutting is faster because metal is soft. Gear life is increased because of greater hardness.

Short-cut No. 2. Formerly press-fitted gear on shaft as separate operation . . . Now TOCCO shrink fits gear on shaft simultaneously with TOCCO-Hardening of gear . . . Result: Eliminates an operation.

TOCCO does the entire hardening and shrink-fitting operation in 15 seconds. Absence of scale and distortion makes the part perfectly accurate and uniform . . . ready for assembly.

The TOCCO machine, clean, compact and devoid of radiant heat and hot gases, is located in the center of the machine shop handy to machining operations.

TOCCO Engineers will gladly help you develop similar improvements in your metal working production. "Results with TOCCO," Bul. 14, free on request.

THE OHIO CRANKSHAFT COMPANY • Cleveland 1, Ohio

TOCCO

HARDENING . . . BRAZING
ANNEALING . . . HEATING
★

which all craft took at Okinawa, was aggravated by the Navy's return of all craft at one time without advance notice to other interested government agencies or private industries of the number of ships expected or the extent of the damage. Many vessels are also in, not for battle damage rapairs, but for ordinary run-of-the-mill voyage repair.

Navy yard authorities still have a call in for some 2700 workers, apparently to handle temporary upsurges of repair work caused by Kamikaze attacks. Private repair yards are letting their men knock off on Sundays and continue to take Maritime Commission and Army Transport work in stride.

Private repairmen, still getting repair jobs from the Navy, can't talk too freely, but behind closed doors are beginning to ask themselves when the Navy is going to call a halt to the expansion of their own $513,000,000 Navy Yard installations in the Bay Region and remember that industry is going to have to provide jobs after the war.

New and interesting suggestion for a solution of the periodic bulges in repair work is to adapt the new longshoremen's dispatching system to industry. Instead of returning from all parts of the Bay to the hiring hall on completion of a loading job, longshoremen are being instructed by radio and telephone to report to the next job direct. Official sources have recommended this new roving gang system to the Maritime Commission. Until the next upsurge the local ship repair situation is expected to remain quiet, with neither the WPB nor the WMC too excited about the situation, in spite of continuing Navy Yard manpower shortages here and in Honolulu.

Two factors bearing directly on this situation are an expected lay off in Bay Area shipyards in August and September of 40 to 50 thousand men, and an approximately $70,000,000 worth of Army construction scheduled to start immediately, which includes major expansion of two air bases. There is a present inclination of workmen to drift away from the still critical housing shortage in urban areas to low living-cost rural localities.

So intense is the lumber shortage—and the aforementioned sheet shortage—that western fabricators are counting on light metals to enable them to start production on civilian goods. Army engineers have already started using aluminum sheets for Pacific housing and revamped the specification which called for plywood flooring.

Recent figures from the California Unemployment Reserves Commission report a total of 30,000 persons drawing unemployment relief—a figure which rocked many a taxpayer back in his chair, particularly in advance of expected mass labor dislocations in southern California and in the Bay Region. Investigation discloses that the 30,000 fell into three distinct groups. There are 13,000 scattered throughout the state, and another 13,000 in southern California where the aircraft program has been severely cut back, but where one plant survey disclosed that only 25 pct of the former employees intended to continue in war work. The remaining 4000 consisted 95 pct of women, and the remaining 5 pct mostly were over age.

Northwest Shipyards In Active Production

Seattle

• • • Future employment prospects in the seven principal shipyards in the Puget Sound area were recently summarized by the Navy Bureau of Ships as follows:

An estimated working force of 30,000 to 36,000 will be required at Bremerton Navy Yard for the duration. Current new construction, now subordinated to ship repair, includes two airplane tenders and one destroyer tender.

Todd Pacific at Seattle has nine destroyers and two destroyer tenders to complete by next January, by which time a floating dry dock will have been installed to level off on ship repair. At Tacoma new construction includes 16 escort carriers, two destroyer tenders and one airplane tender, all to be completed by October, 1946. Augmented working force here is limited by available housing.

At the old Todd repair yard at Seattle two additional dry docks have been installed to provide maximum repair facilities. Puget Sound Bridge and Dredging Co. must complete 13 Navy barges by October when the working force will be reduced to approximately 1500. Lake Washington shipyard is completing a destroyer tender and has limited repair jobs.

Everett Pacific shipyard is using a Navy-owned floating dry dock for its new ship repair program and has 23 harbor tugs to complete by February 1946. Present facilities provide employment for 5000 workers.

Cited for Awards

• • • The following companies have received Army-Navy "E" awards for outstanding war production:

Army-Navy "E"

Fansteel Metallurgical Corp., Tantalum Defense Corp., North Chicago (fourth star)
Alliance Mfg. Co., Alliance, Ohio.
American Radiator & Standard Sanitary Corp., Chicago.
American Spring of Holly, Inc., Holly, Mich.
Allen D. Cardwell Mfg. Corp., Brooklyn.
Carey-McFall Co., Tool Division, Philadelphia.
John L. Chaney Instrument Co., Lake Geneva, Wis.
Clifford-Jacobs Forging Co., Champaign, Ill.
DeKalb Commercial Body Corp., DeKalb, Ill.
Doak Aircraft Co., Inc., Torrance, Calif.
General Motors Corp., Fisher Body Div., Grand Rapids Stamping Division, Grand Rapids, Mich.
H & R Machine & Tool Co., Euclid, Ohio.
Hamilton Pump Co., Inc., Pittsburgh.
Hopkins Equipment Co., Hatfield, Pa.
E. Machlett & Son, New York.
Merit Ordnance Co., Chicago.
Penn Yan Boats, Inc., Penn Yan, N. Y.
Southern States Equipment Corp., Henderson Foundry & Machine Co., Hampton, Ga.
U. S. Magnesium Co., Pleasant Valley, N. Y.
Volco Brass & Copper Co., Kenilworth, N. J.
Webster Chicago Corp., Mfg. Div. & Electronics Div., Chicago.
World Steel Products Co., New York.
Baker Bros., Inc., Toledo (second star)
W. H. Nichols & Sons, Inc., Waltham, Mass. (fourth star)

Gas Ranges Shipped By Airway Freight

Chicago

• • • The first full carload lot of durable goods ever shipped cross country by air freight was sent from Chicago to Los Angeles recently, it was announced by George D. Wilkinson, president of Cribben & Sexton Co., Chicago manufacturers of gas ranges.

The shipment was 18,500 pounds of gas ranges, equivalent of a box car shipment, needed on the West Coast to fill urgent priority orders in connection with expanding housing facilities there.

According to James A. Wooten, national cargo traffic manager of American Airlines, which inaugurated contract airfreighter service with this shipment, about half the cargo was loaded without crating.

The plane, a Consolidated C 39, in which the shipment was made is the largest ever designed specifically for air freight. The ship stands 29 ft high, has a fuselage 90 ft long and a wing spread of 110 ft.

DATA CHART FOR "STAINLESS" USERS

This new Frasse time-saver spotlights physical properties of 16 common stainless steel types for quick comparison. It relieves the necessity for checking scattered specifications—makes it easy to select the *best* stainless type for your specific need.

Included in two-color graphic comparison, are data on nine important factors—tensile strength, yield, izod, creep, machinability, scaling resistance, thermal conductivity . . . and relative base prices. In addition, comparative corrosion resistance tables are handily convenient on the reverse side of the chart.

You'll find this new chart . . . like Frasse stainless inventories and technical counsel . . . unusually helpful in your stainless planning and purchasing. Send for your free copy today. *Peter A. Frasse and Co., Inc., 17 Grand St., New York 13, N.Y. Walker 5-2200; 3911 Wissahickon Ave., Philadelphia 29, Pa. Radcliff 7100—Park 5541; P. O. Box 946, Buffalo 5, N. Y. Washington 2000; Jersey City, Syracuse, Rochester, Hartford, Baltimore.*

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STAINLESS STEEL SHEETS, STRIP, PLATES, BARS, WIRE, PIPE & TUBING
AIRCRAFT ALLOY BARS & TUBING • SEAMLESS PIPE & CONDENSER TUBING
SEAMLESS CARBON & ALLOY TUBING • WELDED CARBON & ALLOY TUBING

Peter A. FRASSE & CO., Inc. 28-I
Grand Street at Sixth Ave., New York 13, N. Y.
Gentlemen:
Please send me without obligation, a copy of the new FRASSE Data Chart Section A, No. 4.

Name..... Title.....
Firm.....
No. & St.....
City..... Zone..... State.....

PERSONALS

o o o

• **John D. Tully** has been appointed manager of sales, Rails and Accessories, Bethlehem Steel Co., Bethlehem, Pa. Mr. Tully has been connected with railroad sales in the company's New York office since June 1925. **Murray A. Vickers** of the Cleveland office has succeeded Mr. Tully in New York. Mr. Vickers has been with Bethlehem Steel since August 1924. Both men started in the Frog and Switch Dept.

• **W. W. Smith**, retired Air Technical Service Command officer, has been designated executive engineer in charge of body design and development at Studebaker Corp., South Bend, Ind. **Stan W. Sparrow**, chief aircraft engine test engineer, has been appointed director of research development. **S. A. Jeffries** has been made the new chief truck engineer; **E. M. Douglas**, executive engineer for manufacturing and service; and **H. E. Churchill**, chief research engineer and assistant to Mr. Sparrow.

• **Axel W. Hedberg** has been appointed works manager, Marion Steam Shovel Co., Marion, Ohio. Mr. Hedberg recently resigned as St. Clair Div. branch manager, Parker Appliance Co., Cleveland.

• **Theodore A. Dykstra**, division superintendent of the Olds 155-mm. shell plant, has been appointed manager of the technical department of General Motors' service section, succeeding **Milton H. O'Brien**, resigned.

• **Harry L. Huntley** has been appointed headquarters repair sales manager of the 34 plants of the Manufacturing and Repair Dept., Westinghouse Electric Corp., with headquarters in Pittsburgh.

• **G. A. Custer** has been promoted from chief engineer to general factory manager, Peninsular Grinding Wheel Co., Detroit. Prior to coming to Peninsular as chief engineer 9 years ago, Mr. Custer had been associated with the U. S. Rubber Co., and with the U. S. Steel Corp.

• **Victor V. Nordlund** has been appointed assistant plant industrial engineer at the Gary, Ind., sheet and tin mill, Carnegie-Illinois Steel Corp., Pittsburgh. He formerly had been assistant to the plant industrial engineer in charge of planning.

• **Glenn A. Mellinger** has been promoted to assistant sales manager, Ohio Rubber Co., Willoughby, Ohio.

JOHN D. TULLY, manager of railroad sales, Bethlehem Steel Co.

WALTER F. MUNFORD, assistant vice-president, American Steel & Wire Co., as announced in THE IRON AGE, July 12.

• **Ernest C. Brelsford** has joined Thompson Products, Inc., Cleveland, as assistant to J. H. Coolidge, vice-president and treasurer.

• **J. H. LoPrete**, formerly chief chemist, Wolverine Tube Div., Calumet & Hecla Consolidated Copper Co., Detroit, has been made plant metallurgist in the same division.

• **G. A. Gustafson** has been appointed construction manager of the General Electric Plastics Div., Pittsfield, Mass. Mr. Gustafson, who has been manufacturing manager of the division since March 1942, has been succeeded by **L. S. Gleason**, manager of the Pittsfield molding works.

• **Henry A. Mullen**, formerly welding supervisor at the Willow Run plant of the Ford Motor Co., has joined the Sales Dept., Ampco Metal, Inc., Milwaukee. Mr. Mullen will be attached to the Detroit field engineering office as resistance welding consultant.

• **R. L. Miller** has been appointed sales manager, with **C. L. Brown, Jr.**, his assistant, of the Norma-Hoffmann Bearings Corp., Stamford, Conn. **E. M. Beers, Jr.**, and **G. V. Titsworth** have been made assistant sales managers. **W. G. Sargent** has succeeded as manager of distributors' sales, **Carl W. Hedler**, who has resigned as western sales manager and manager of distributors' sales.

• **George W. Munson**, electrical superintendent of the American Tube & Stamping plant of The Stanley Works, Bridgeport, Conn., has announced his retirement as of August 1. Mr. Munson has been actively connected with the steel industry for 42 years.

• **W. J. Maquire**, works manager of the Jefferson Ave. plant of Chrysler Corp., Detroit, has been appointed production manager of the Chrysler Div. **F. A. Wunderlich**, general superintendent of Curtiss Wing Div. of Chrysler, has been made works manager of the Chrysler Kercheval body plant. **A. P. Callies**, superintendent of the Kercheval plant, has succeeded Mr. Maquire at the Jefferson Ave. plant.

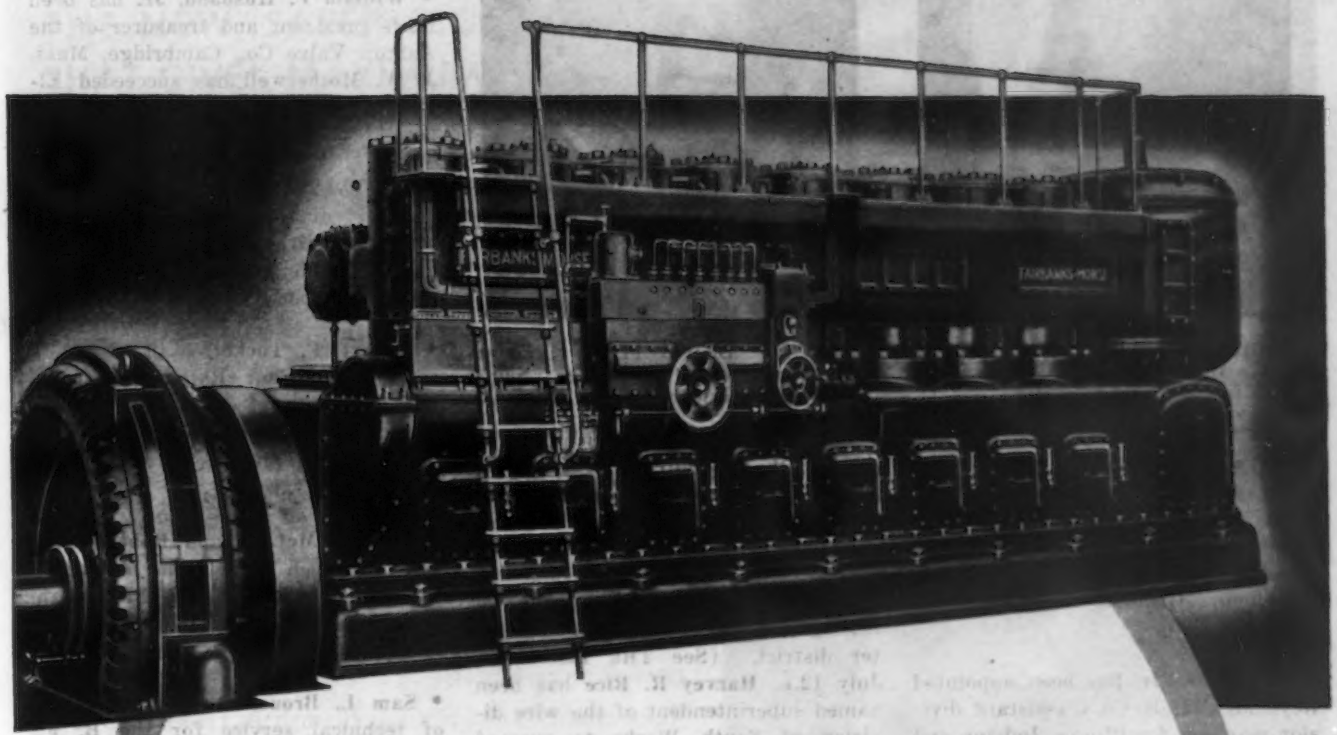
• **John A. Fraser**, formerly special metallurgist at Ford Motor Co. has joined Commercial Steel Treating Corp., Detroit, as chief metallurgical engineer.

• **E. S. Wellock**, plant manager of the Chevrolet Transmission Div., Saginaw, Mich., has been appointed assistant general manufacturing manager in charge of Chevrolet assembly plants, succeeding **E. C. Shaw**, resigned. **Caryl Chaney**, general superintendent at the Saginaw plant, has succeeded Mr. Wellock.

• **Robert R. Miller** has been made sales manager, industrial trades, and **W. J. Streicher**, sales manager, distributor trades, in the Cincinnati territory, for Minnesota Mining & Mfg. Co., St. Paul.

FAIRBANKS-MORSE

A name worth remembering



FAIRBANKS-MORSE is the name to think of first when you need Diesel engines. The performance records of more than five million horsepower of these Diesels prove they have the stamina to stand up in sustained, heavy-duty service . . . that they are built for low maintenance cost as well as low fuel cost.

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The outstanding performance records of Fairbanks-Morse Diesels have been made in every kind of industrial service . . . under every imaginable condition. These great engines have competed against almost every known source of power and come up first.

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Pumps • Scales • Generators • Motors
Magnetos • Railroad Motor Cars and Standpipes • Stokers • Farm Equipment

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RAYMOND A. COLE, vice-president, Pope Machinery Corp.

VAN H. LEICHLITER, general superintendent, Worcester South Works, American Steel & Wire Co.

• **Raymond A. Cole** has been elected vice-president, Pope Machinery Corp., Haverhill, Mass. He was formerly experimental engineer in charge of grinding machine research and development, Grinding Machine Div., Norton Co.

• **J. O. Low, Jr.** has been appointed Reynolds Metals Co.'s assistant division manager for Illinois, Indiana and Iowa, with headquarters in Chicago. Mr. Low formerly was a sales representative for the Bethlehem Steel Co. and the Jones & Laughlin Steel Corp.

• **Don H. Krey** and **Elliott G. Johnson** have been appointed sales manager and assistant sales manager, respectively, Homestead Valve Mfg. Co., Inc., Coraopolis, Pa.

• **William H. Homeyer** and **Francis J. Blake** have been appointed district sales managers of The Carborundum Co., Niagara Falls, N. Y., in the southern California and northern California areas, respectively.

• **Harry R. Clarage** has been elected president of Clarage Fan Co., Kalamazoo, Mich. He has succeeded the late R. R. Ware. **Robert A. Wasson** has been appointed vice-president, general manager, and a member of the board.

• **A. S. Knoizen**, executive vice-president of Joy Mfg. Co. and Sullivan Machinery Co., Franklin, Pa., has been elected a director of the Reliance Electric & Engineering Co., Cleveland. He is also director of the Mining Div. of the WPB.

• **Van H. Leichliter** has been appointed general superintendent of South Works, Worcester, Mass., of American Steel & Wire Co., Cleveland, succeeding George A. Gleason, who recently was promoted to the post of manager of operations in the Worcester district. (See THE IRON AGE, July 12.) **Harvey R. Rice** has been named superintendent of the wire division of South Works to succeed Mr. Leichliter. **Wade B. Houk** has been promoted to assistant superintendent of the wire division, succeeding Mr. Rice.

• **H. C. Brogan** has resigned as vice-president and general manager of the Kewaunee Shipbuilding & Engineering Corp., Kewauna, Wis.

• **T. C. Downey**, manager of the Chevrolet plant at Janesville, Wis., and later manager of this same plant when it was acquired by Oldsmobile for its shell program, has been named assistant manufacturing manager for Oldsmobile, with headquarters at Lansing, Mich.

• **William P. Husband, Jr.** has been made president and treasurer of the Ashton Valve Co., Cambridge, Mass. **J. W. Motherwell** has succeeded Ellery Peabody as chairman of the board.

• **Dr. T. L. Gresham** has been named director of organic chemicals research and **Dr. C. F. Gibbs** director of polymerization research, B. F. Goodrich Co., Akron, Ohio.

• **Robert F. Tucker**, staff assistant to Vice-President Ralph C. Stuart, has been appointed manager of the recently-acquired Ken-Rad Lamp Div. of the Westinghouse Electric Corp., at Owensboro, Ky.

• **Edward McLeod** and **Robert Shekell** have been named zone managers for the Cincinnati and Pittsburgh areas, respectively, Graham-Paige Motors Corp., Detroit.

• **Sam L. Brous**, formerly manager of technical service for the B. F. Goodrich Chemicals Co., Cleveland, has been appointed sales promotion manager for plastic materials.

• **Charles B. Hull** has been appointed chief draftsman and **Walter L. Longnecker**, division metallurgist of hot mills of the American Steel & Wire Co., Cleveland.

OBITUARY...

• **Henry D. Miles**, chairman of the board of directors of the Buffalo Foundry & Machine Co., and president of the American Foundrymen's Association in 1912, died July 6. He was 80 years old. Mr. Miles was president of the company from 1902 to 1943.

• **Herbert J. Winn**, chairman of the board, Taylor Instrument Co., Rochester N. Y., died unexpectedly June 27. He was 74 years old. Mr. Winn began his career with the company in 1893; in 1913, he was elected president of the company, a position which he held until 1938 when he was made chairman of the board.

• **Roland R. Ware**, 61, president and general manager of Clarage Fan Co., Kalamazoo, Mich., died recently. Mr. Ware had been associated with the company for more than 36 years. He was general manager for 15 years, and president since May 1943.

• **Louis Stockstrom**, chairman of the board, American Stove Co., St. Louis, died recently, at the age of 86. With his brother, the late Charles Stockstrom, he founded the Quick Metal Stove Co. in 1882, which later became the American Stove Co.

• **Brewster L. Cornwell**, supervisor of the General Electric Co.'s Pittsfield ordnance division, tool department, died July 3. He was 48 years old and had been with the company since 1912.

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JAL-TREAD

THE NEW, SAFER FLOOR-PLATE THAT GIVES MAXIMUM NON-SLIP PROTECTION

Jal-Tread is a new development in rolled-steel floor plates, for Jal-Tread is a new checker floor plate actually made with "checkers" . . . 300 miniature squares per square foot, functionally designed to combine maximum non-slip friction surface at point of contact, with modern, attractive appearance.

Jal-Tread and Junior Jal-Tread are easy to cut, bend, weld and install, easy to clean and keep clean, and come in a wide range of sizes and weights. Your local J&L office or favorite warehouse will be glad to supply you with delivery information.

The full story of Jal-Tread is told in the new illustrated Jal-Tread booklet that is yours for the asking. Send for your copy.

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CONTROLLED QUALITY STEEL FOR WAR AND PEACE

J&L STEEL

Dear Editor:

TOOL STEELS

Sir:

Enclosed you will find a check for $2.50 for five copies of the new edition of the Tool Steel Directory.

R. HOMER LINDAHL,
Chief Toolmaker
Hickok Electrical Instrument Co.,
Cleveland 8

Sir:

I would appreciate receiving a copy of THE IRON AGE Directory of Tool Steels."

C. E. WILDERMAN,
Chief Metallurgist
Utica Drop Forge & Tool Corp.,
Utica, N. Y.

● In quantities of five or more, available at 50¢ each: fewer copies at $1 each.—Ed.

SCREW THREAD STANDARDS

Sir:

We would appreciate receiving two copies of an article entitled "American-British-Canadian Screw Thread Standards Near," which appeared in the Nov. 30, 1944 issue.

S. MATTHEWS,
Assistant Chief Engineer
Dowty Equipment, Ltd.,
Dominion Eq. Bldg., Montreal

● Tear sheets mailed.—Ed.

LABRADOR IRON ORE

Sir:

Kindly send us the exact address of Dr. J. A. Retty, Labrador Mining & Exploration Co., Ltd., Quebec, Canada. We would like to write to Dr. Retty in connection with the article entitled "Hollinger Finds Large Reserves of High Grade Iron Ore in Labrador," which appeared in the April 26 issue.

B. T. DUPONT
Plastic Metals, Inc.,
Johnstown, Pa.

● Sorry to say we do not know the street address of Dr. Retty.—Ed.

COLD HEADING PRACTICE

We are enclosing 25¢ in payment of a reprint of "An Appraisal of Precision Thread Rolling Practive," and a copy of "An Appraisal of Cold Heading Practice," from the June 9, 1938 issue.

B. B. FELDMAN,
Works Manager
Allmetal Screw Products Co.,
33 Greene St., New York 13

● Reprints have been mailed.—Ed.

PRECISION CASTINGS

Sir:

Kindly send me the booklet containing articles on precision casting and turbo supercharger bucket.

A. C. PETERSON,
Assistant Chief Engineer
Union Special Machine Co.,
Chicago 10

Sir:

Please find enclosed 50c. for the precision casting articles published in the past year.

C. L. SIMS
Sims Matchplate Co.,
Syracuse, N. Y.

Sir:

Please send me two copies .....

WM. W. AUSTIN, JR.
Consolidated Vultee Aircraft Corp.,
Nashville, Tenn.

● A compilation of seven articles is available at 50¢ per copy.—Ed.

BRAZIL AGENT

Sir:

We are interested in representing for the Brazilian market, manufacturers and exporters of all kinds of steel, including high speed steel, tool steel, stainless steel, drill rod, black and galvanized steel sheets, galvanized and black wire, barbed wire, tubing and other steel products. We therefore request that you invite those interested in our present proposal to send us their mill program and their conditions to govern our business relations.

F. KYNABIS LUND
Sociedade Comercial Saad Ltda.,
Praca Patriarca, 26, Sao Paulo, Brasil

NEW SINTERED CARBIDE

Sir:

In the June 12 issue, an article in News Front discussed a new sintered carbide developed by the Germans. I would like to know if any more information is available.

HENRY De COURSEY,
Consultant Engineer
1626 Myrtle St., Oakland 7, Calif.

Sir:

If the data are available to the public covering this new sintered carbide, we would appreciate advice as to whom we may apply for it.

S. M. MOREY,
President
Morey Machinery Co., Inc.,
4-57 26th Ave., Astoria, N. Y.

● Further information on this new carbide has been placed in the hands of makers in this country but it is still classed as secret. However it may be possible to secure additional details by addressing A. F. Greaves-Walker, exec. secretary, Metals & Minerals Subcommittee, T.I.I.C., Room 1007, Tempo R Building, Washington 25, D. C.—Ed.

PRECISION CASTING

Sir:

We have noted the article on "Precision Casting of Low Alloy Steels" in the June 21 issue. If reprints of this article are available, we would like to obtain 10 copies.

PHILIP W. RUSH
Universal-Cyclops Steel Corp.,
Bridgeville, Pa.

● Reprints were not made but we are mailing tear sheets.—Ed.

O'MAHONEY REPORT

Sir:

It was with great interest that I noticed in the June 21 issue your extensive coverage of the War Contracts Subcommittee's progress report on the disposal of iron and steel plants. I trust that your making available the contents of the report will greatly contribute to the success of the hearings on formation of policies with respect to disposal of steel plants.

KURT BORCHARDT,
Counsel, War Contracts Subcommittee
United States Senate,
Committee on Military Affairs,
Washington, D. C.

● Reprints of this summary are available at 10¢ each.—Ed.

BOUND VOLUMES

Sir:

We are disposing of our bound file of THE IRON AGE, vol. 127 (1931) through vol. 140 (1937). Would you be interested in this file? The volumes are in excellent condition, bound in black buckram.

AGNES REINERO,
Librarian
Pacific Gas & Electric Co.,
245 Market St., San Francisco 6

● We have our own bound copies, but perhaps some of our readers may desire them.—Ed.

GENEVA STEEL

Sir:

Will you please let us know if you have published any articles describing the Geneva Steel Co. of Geneva, Utah, and if so, what issues they were in. If nothing has been printed to date, will you please let us know if you contemplate writing any, and how soon?

C. J. KLEIN,
Chief Engineer
Weirton Steel Co.,
Weirton, W. Va.

● A long list of articles has been mailed.—Ed.

TIME STUDY USE

Sir:

Please send me one reprint of "Managerial Use of Time Study," by Ralph A. Stearns, published in the April 19 issue.

R. H. TIMMONS,
Manager of Mfg.
Transportation & Generator Div. of
Westinghouse Electric & Mfg. Corp.,
East Pittsburgh

● Tear sheets have been mailed.—Ed.

the *unusual* in Springs is *not unusual* at Muehlhausen

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Springs of every shape and size, in quantities large and small, are part of everyday production. Muehlhausen craftsmen are able to produce the correct spring for every requirement—whether a tiny compression spring that will be flexed a hundred times a minute; or a large, hot-formed spring that must withstand extreme operating temperatures.

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This Industrial Week . . .

- **No Change in Tight Sheet Outlook Yet**
- **Last Quarter Delivery Easement Seen**
- **Steel Rate Up One Point to 90.5 Pct**

THE War Production Board this week was still continuing its efforts to ease the tight steel sheet situation, but so far the relief has been negligible. It is believed, however, that by the fourth quarter, deliveries on nonrated sheet orders will be much easier than at present.

Some trade sources say that even if a large volume of cancellations should result from WPB's move they probably would not reach mill books until some time next week. Cancellations covering all types of steel orders in June surpassed by a wide margin the experience in any other month this year. Despite this volume of cancellations, deliveries are still quite extended.

Validated or rated order volume regained somewhat the sharp losses reported last week and averaged about the same tonnage as in recent weeks. Nonrated requests, however, were still at low ebb.

The reduction in orders for reconversion production is largely due to the heavy backlogs of unrated tonnage already being carried by most mills, with enough of this business on the books to carry the mills for six months after the end of the controlled materials plan. Customers as well as steel producers feel that the future beyond that point is too uncertain to attempt to negotiate additional business.

Order books for bar and semifinished steel items are fairly well filled through the remainder of this year and into the first quarter of 1946. Tinplate schedules for November have been almost completely filled by canmakers orders and December is about the earliest delivery date for tinplate.

CANCELLATIONS in cold drawn bar tonnages have expanded recently due to realignments in schedules for small shells. The OPA may this week adjust base prices on cold finished bar and shafting. It is understood that the base price will be lowered but that extras will be rearranged so that the net change in the price of these items will not be much if any.

A substantial reduction has been made in carryovers for steel bar items by most mills, although in one area the undelivered tonnage is still large. Heavy deliveries slated for the last quarter of this year may be expected to wipe out the remainder of the carryovers.

The supply of merchant wire items is still inadequate to meet the heavy demand. Small size nails and bail ties are said to be extremely short. Steel posts and wire products generally were experiencing a heavy demand this past week.

Steel firms report that cancellations of war contracts are having little effect on the manpower situation. One of the most difficult problems in the steel industry is the inability to obtain common labor. The increasing numbers of men appearing at employing offices, as they are laid off at other plants, are not ready to take a reduction in wages but are seeking a job matching their previous one in pay.

The lack of skilled manpower for the production of cold rolled sheets is a major factor in keeping down the output of that item. One steel producer has said that if adequate manpower were available, cold rolled sheet production could be increased as much as 50 pct with existing facilities.

Progress is being made in the completion of pretermination agreements between steel producers and military buying agencies. According to indications at Pittsburgh, steel producers have, temporarily at least, won their fight to have claims for steel-in-process on government contracts based on a commercial price setup rather than on the basis of an arbitrary formula.

INTEREST reached a high pitch in the railroad car field this week when construction of 36,750 cars for the French and 6000 cars for India was suspended. It was also reported that all locomotives on an order involving 500 for Russia if not completed by Aug. 31 are to be canceled. If recent schedules on this locomotive construction are adhered to, it might mean that about 280 locomotives will not be delivered. The suspension on the French and Indian orders will probably mean that it will be some time before work is begun on this business.

The inquiries by the War Dept. for 1300 freight cars reported recently have been ordered with 30-ton capacity, 42 in. track gage and cast iron wheels. The orders are placed as follows: American Car & Foundry Co., Madison, Ill., 4000 box cars; ACF, Milton, Pa., 190 tank cars; ACF, Chicago, 130 refrigerator cars; Bethlehem Steel Co., Johnstown, Pa., 1290 low-side and 1200 high-side gondolas, and 500 flat cars; General American Transportation Corp., Chicago, 1860 flat cars; Sharon, Pa., 190 tank cars; Greenville Steel Car Co., 1500 flat cars; and Pullman-Standard, Butler, Pa., 1840 box cars. Although the schedules for the production have not yet been announced, it is reported that they will be given preference for delivery this year.

New domestic railroad inquiries include the following: Santa Fe, 1500 50-ton box cars, 250 70-ton covered hoppers; Clinchfield Railroad Co., 1000 50-ton hoppers, 300 50-ton box cars, 50 50-ton flats; Southern Pacific 1000 50-ton box cars, 750 50-ton auto box cars, 50 25-ton cabooses; and Missouri, Kansas & Texas, 50 70-ton covered hoppers.

A slight betterment in the steel ingot rate occurred this week with operations moving up one point to 90.5 pct of rated capacity.

•**U. S. STEEL SHIPMENTS**—Shipments of finished steel products by subsidiary companies of U. S. Steel Corp. for June 1945 totaled 1,602,882 net tons. This compares with 1,797,987 net tons in May, a decrease of 195,105 net tons, and with 1,737,769 net tons in June 1944, a decrease of 134,887 net tons. Shipments for the first six months of 1945 were 10,124,959 net tons compared with 10,632,854 net tons in the comparable period of 1944, a decrease of 507,895 net tons.

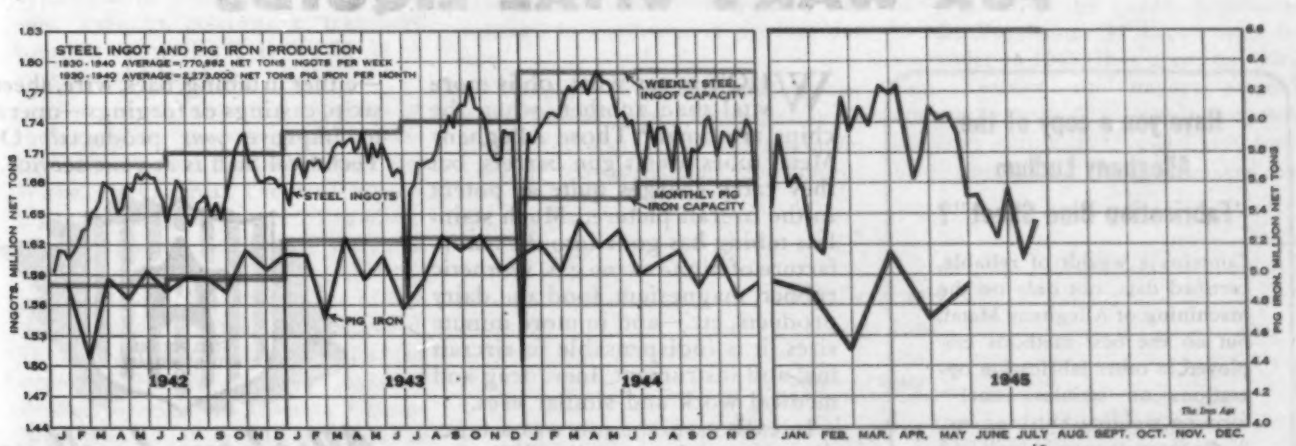
• **STEEL WAGES**—Steel company payrolls during May rose to the second highest monthly total on record, but number of men employed continued the decline which has gone on virtually without interruption since mid-summer 1942, it is indicated in a report released recently by the American Iron & Steel Institute. During May steel company payrolls totaled $154,035,100, as compared with $146,954,800 in April and $145,426,600 in May a year ago. The May total is exceeded only by March 1945 payrolls of $154,976,700. An average of 564,600 employees was at work in the industry during May, as against 567,200 in April and 569,100 in May 1944. Wage-earning employees in the industry earned an average of 126.4c per hr in May, exactly the same as in April but substantially higher than average hourly earnings of 118.4c in May a year ago. Wage earners worked an average of 47.7 hr per week in May, compared with 46.5 hr per week in April and 47.5 hr per week in May a year ago.

• **START AUTO BODIES**—The Seaman Body Div. of Nash-Kelvinator Corp., located at Milwaukee, is laying off some 1300 employees due to fulfilling of Navy airplane contracts. The firm plans to again begin production on automobile bodies as soon as the uncertain materials situation clears up.

• **ALL ALUMINUM CARS**—Missouri Pacific Railroad has announced that it was placing orders for 87 freight cars that will have all-aluminum superstructures. Of the cars, 47 will be built by Pullman-Standard Mfg. Co., Chicago, and 40 by American Car & Foundry at St. Charles, Mo. Orders for the aluminum have not yet been placed, but probably will be this week. In addition to the 87 aluminum freight cars, there will also be built for Missouri Pacific 13 all-steel mail and baggage cars. The Missouri Pacific Railroad services many of the larger bauxite mining developments in the South and Southwest.

• **STEEL OUTPUT**—During the first six months of this year the steel industry produced 43,180,223 tons of steel ingots and steel for castings, the American Iron & Steel Institute announced recently. That tonnage was more than two-thirds of the total steel produced in the entire year of 1929, the record peacetime production year, but it was lower than the output of any half-year since the middle of 1942. While March in the first half of this year was the third highest on record from the production standpoint, the industry encountered severe cold weather, floods, coal and labor shortages and other obstacles to production. On VE-Day operations were around 95 pct of capacity, but in recent weeks the rearrangement of war contracts and a series of sporadic labor disputes have depressed production. The six-month production for 1945 was 1,963,000 tons below the record 45,143,390 tons of steel made in the first half of 1944. Operations averaged 91.1 pct of capacity in the 1945 half-year, compared with 96.9 pct in the first half of 1944, and calculated weekly production was 1,669,123 tons against 1,735,617 tons. Production in June 1945 was 6,868,717 tons, 582,086 tons below the output of 7,450,803 tons in May. The industry operated at 87.4 pct of capacity in June, compared with 91.8 pct in May. Calculated weekly production was 1,601,100 tons against 1,681,897 tons per week in May. In June 1944 production totaled 7,234,257 tons, while operations averaged 94.1 pct and weekly production was 1,686,307 tons.

• **NO STEEL RAILS FOR SPAIN**—Shipment of 100,000 tons of steel rails to Spain has been rejected, the Foreign Economic Administration announced. Philip Murray, CIO and USWA head, protested such a shipment when he said that our own railroads were badly in need of material. FEA officials said no steel rails have been sent to Spain and that no license has been granted for such shipments.


STEEL INGOT AND PIG IRON PRODUCTION
1930-1940 AVERAGE = 770,992 NET TONS INGOTS PER WEEK
1930-1940 AVERAGE = 2,273,000 NET TONS PIG IRON PER MONTH
WEEKLY STEEL INGOT CAPACITY
STEEL INGOTS
MONTHLY PIG IRON CAPACITY
PIG IRON
INGOTS MILLION NET TONS
PIG IRON, MILLION NET TONS
1942
1943
1944
1945
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
July 10.....	89.0	94.5	90.0	93.0	79.0	104.5	90.0	95.0	89.5	69.0	55.0	83.0	93.0	89.5
July 17.....	88.5	94.5	90.0	93.0	89.0	98.0	90.0	94.0	94.0	70.0	96.0	89.0	93.0	93.5

OWI Photo by Palmer in an Allegheny Ludlum plant

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Conquest of Malay And Indies Will Not Ease Tin Shortage

By JOHN ANTHONY

CONQUEST OF THE INDIES: *Australian troops landing on the coast of Borneo, close to Dutch and British tin producing areas.*

Washington

• • • With Australian and Netherlands troops edging down the coasts of Borneo, whose extremity is not more than 400 miles from the tin producing Malay States and only 150 and 250 miles, respectively, from the Dutch tin producing islands of Billiton and Bangka, metalmen have been anticipating early action to improve tin supplies.

However, Erwin Vogelsang, director, Tin, Lead and Zinc Division of WPB, is not hopeful of bringing tin concentrates in quantity from British Malaya or the Netherlands East Indies within two years after conquest, and perhaps even longer. The principal factor which would affect the timing of new tin production in these areas, in his opinion, is the condition of the native populations. If the enemy were to destroy or transport prospective workers, it would be a very serious handicap.

There is no danger of sabotage of the producing properties since these tin deposits are alluvial and are worked by dredges. The dredge manuacturers have all converted to munitions production during the war, and there is no reason to assume that the prewar dredge production time of two years could be materially improved. However, it may be assumed that the enemy will have destroyed existing dredges or removed them to Chinese properties whose production would be sufficient for Japan's relatively small requirements.

There are a number of dredges in the hands of western gold producers, inactive for gold production during the war, but now that mining is permitted again it is doubtful whether their equipment would be voluntarily relinquished to British and Dutch tin producers.

Assuming that natives remain in these areas when United Nations troops take them, it would be necessary to establish a supply line of commodities in which to pay them since money would have no value to them. Another time consuming requirement would be the establishment of the power plant necessary to operate the concentrators.

Recognizing these facts, the Tin, Lead and Zinc Division has determined to present full statistics to industry on the supply-requirements position of tin, not permitted earlier because of the need for military secrecy. The bureau has also recommended means of circumventing the shortage in reconversion product design.

Total pig tin available for allocation and industrial reserve stocks, after allowing for an 18,000 ton minimum working inventory and government stockpile, amounted to only 23,654 tons on May 1, 1945, compared with 83,076 tons on Jan. 1, 1942, a drop of 70 pct in available supplies.

In comparison with the sharp decline in supplies of pig tin, consumption of tin and tin in alloys rose from an annual rate of about 86,000 tons in 1942 to above 90,000 tons in 1944, despite conservation measures and substitutes which have become more and more restrictive as the stockpile diminished. All classes of tin consumption have declined from prewar levels as a result of these measures except use for babbitt and for brass and bronze.

The outlook for an early substantial increase in tin production does not appear bright even in the event of an early surrender by Japan, according to Mr. Vogelsang. If Japan were to surrender in 1945, it is predicted that Far Eastern tin imports would amount to only 6000 tons of concentrates by spring, 1947, and 13,000 tons by spring, 1948. These estimates are

Pig Tin Reserves
Long Tons

	Government Stocks Available for Allocation	Private Reserve Stocks *	Total Reserve Stocks
January 1, 1942	42,606	40,470	83,076†
January 1, 1943	56,548	14,852	71,400
January 1, 1944	40,675	5,766	46,441
January 1, 1945	29,037	0	29,037
May 1, 1945	22,418	1,236	23,654

* After deducting 18,000 lb minimum working inventory and stockpile.

† Total combined government and private stocks on this date 143,000 tons, including 10,000 tons Treasury-owned tin and 2000 tons Navy-owned, neither available for allocation.

Domestic Tin Consumption
Long Tons

	1942	1943	1944	1945 January-April Incl.
Tin and terneplate	29,404	22,643	26,337	8,878
Brass and bronze	27,655	28,839	33,625	10,657
Solder	13,824	13,098	13,868	5,476
Babbitt	6,099	7,381	8,503	2,871
Tinning	3,015	2,517	3,242	1,117
Collapsible tubes	1,639	602	520	150
Foil	576	371	382	121
Type metal	1,153	550	861	307
Chemicals	246	133	81	40
Pipe and tubing	161	117	250	76
Unclassified	2,764	5,589	2,683	1,041
	86,096	81,840	90,352	30,734

based on the assumption that the United States would receive the total production of the Netherlands East Indies, which is problematical.

During this period, much of our tin imports will be lost to liberated or neutral countries actively competing for supplies. Many of these countries have smelting plants for the production of pig tin from concentrates.

Domestic tin mining is all but nonexistent, but a government-owned tin smelter has been established in Texas City, Tex. The original plans for the smelter called for an annual capacity of 18,000 tons of fine tin from relatively low grade Bolivian concentrates from lode mine ores. These concentrates contain impurities such as copper, lead, zinc, iron, bismuth, arsenic, antimony, sulfur, and others. Therefore it was necessary to establish a plant at Texas City to beneficiate them by concentration, roasting and leaching before delivery to the smelter. The high grade Patino Bolivian concentrates go to British smelters under contract.

Imports of Tin Into the United States
Long Tons

	1942	1943	1944
Tin in Concentrates (ore)			
Argentina			42
Belgian Congo		4,094	7,549
Bolivia	20,918	21,289	28,730
French Cameroons	161	283	177
Mexico	45	212	39
Netherlands East Indies	7,977	.....	.....
Other	.....	8	.....
Total	29,101	25,886	36,537
Metal			
Belgian Congo	11,224	11,550	10,000
British Malaya	7,791	.....	.....
China	3,626	.....	3,338
Netherlands East Indies	3,922	.....	.....
Portugal	99	364	.....
United Kingdom	87	.....	.....
Other	4	5	.....
Total	26,753	11,919	13,338
Total Tin Imports	55,854	37,805	49,875

WPB Tin Conservation Recommendations

Tin Product	Proposed Substitute
Solder	Silver-lead solders
Tinned refrigerator coils	Aluminum refrigerator coils requiring no tinning
Tinned steel shelving	Aluminum or galvanized steel shelving
Babbitt metal	Copper-lead-silver bearings Lead arsenic bearings Low tin babbits

The smelter was subsequently enlarged to a capacity of 52,000 tons of pig tin per year, 30,000 tons from Bolivian ores sweetened with 22,000 tons from high grade alluvial ores. Smelting began in April 1942. During the latter part of 1942, further expansion was authorized to provide capacity to smelt the entire supply of United Nations concentrates, should British smelters be bombed out. Therefore present capacity is between 70,000 and 90,000 tons of pig tin per year depending on the type of ore available.

In attempting to stretch current supplies of tin, WPB officials have recommended the use of alternative materials.

Bullet Core Work Stopped by Army

Chicago

• • • **Production** of 50 caliber machine gun bullet cores by the Ordnance Division of the Edison General Electric Appliance Co., Inc., 1531 S. 54th Ave., Cicero, will be stopped July 31 as the result of a contract cancellation, it was announced recently by the Army.

Approximately 1200 workers at the Ordnance Division will be released during the next three weeks, according to R. W. Turnbull, company president. He stated that the bullet core termination does not affect war work in progress at the company's two other plants in the Chicago area.

Col. John Slezak, chief of the Chicago Ordnance District, stated that the termination reflected a reduced demand for small arms ammunition following the end of hostilities in Europe. The amount of work cancelled totaled around $3,900,000, Colonel Slezak said.

Briggs Reconversion To Cost $10 Million

Detroit

• • • **Stockholders** of Briggs Manufacturing Co. have been told that the firm has begun to prepare its plants for peacetime work 25 pct in excess of peak prewar manufacture. Half of the company's floor space has already been freed of war work through cutbacks and cancellations, and reconversion is under way. Previously it had been announced by W. P. Brown, president, that the company would spend $10 million on reconversion.

Kaiser Proposes Syndicate To Lease Far Western Steel Plants

San Francisco

• • • A Kaiser syndicate is proposed by Henry J. Kaiser and Associates as a means of leasing the Geneva Steel plant and combining under a working arrangement with the Colorado Fuel and Iron Co. and the Wickwire-Spencer Steel Co. so that the major far western mills at Minnequa, Colo., Geneva, Utah, and Fontana, Calif., might be operated postwar under a single management by a western group to provide cheap steel for far western industries and consumers.

In a letter to the Defense Plant Corp. dated July 13, Mr. Kaiser states that he is arranging a syndicate of western financial and industrial interests and that his proposal has been jointly considered by General Metals Corp. and other interested parties. He proposes to lease the Geneva plant for an initial term of five years, renewable for successive similar periods. The syndicate would arrange to finance modification of the Geneva plate mill for the rolling of hot strip at an estimated cost of $7 million, modified facilities to become the property of the government. Rental for the plant is to be negotiated at an amount per ton of finished steel products based on the valuation of the property determined by RFC consultants, taking into account the value of modified facilities. Costs of modifying the mill are to be applied in discharge of the first rentals. It is stipulated that the Kaiser syndicate be granted an option to purchase at a price to be agreed by negotiation.

To accomplish its operation under the proposed lease, the syndicate contemplates erecting a cold strip mill and tinplate facilities probably at Fontana at an estimated cost of $25 million, a seamless tube and electric welded pipe mill in Utah at a cost of $25 million, and railroad car fabricating facilities with plant for manufacturing steel wheels and axles in Utah at a cost of approximately $12 million.

Contingent upon satisfactory statement of paid-in capital, the syndicate has been assured by the Bank of America that adequate working capital will be provided by that institution or by a banking syndicate. It is further stated that "the Kaiser syndicate has had under consideration with the Colorado Fuel & Iron Co. and the Wickwire-Spencer Steel Co., proposals whereby all of the interests mentioned could be combined. The said proposals anticipated extensive expansion into facilities to produce additional end products."

Finally, it is pointed out that the above proposals and representations are contingent upon successful conclusion of financial arrangements now pending in connection with the write-down on the RFC loan to Kaiser Co., Inc., on the Fontana steel plant.

A set of charts has been developed by the syndicate and submitted in connection with the proposal diagramming the integrated operation of the Minnequa, Geneva and Fontana mills in supplying finished steel products to the 16 western states, not including North Dakota. At Fontana would be a hot strip mill, a cold reduction mill, tinplate facilities for buttweld pipe, structural and merchant product mills. In Colorado would be produced structurals, rod and wire, rails and merchant products. Geneva would contribute seamless pipe, railroad wheel and axle products, plates and structurals, in addition to a railroad car shop.

It is pointed out that the total consumption of finished steel products in the 16 western states is 5,728,300 net tons divided as follows: Oil country pipe 869,800 net tons, rails and accessories 674,400, wire and wire products 562,500, structural (including wide flange) 560,100 tinplate 496,000, sheets—black 428,400, bars (including cold finished alloys) 390,000, plates 378,400, buttweld pipe 336,500, reinforcing bars 330,900, all other pipe 300,700, sheets—galvanized 265,400, forging blooms and billets 33,200, miscellaneous 102,000 net tons.

Ingot production in the major mills included under the proposed syndicate, together with present openhearth and rolling facilities at prewar West Coast mills, is stated as 4,352,000 ingot tons. At 100 per cent capacity this would provide 53 per cent of the ingot tons necessary to produce the finished steel products consumed in the 16 state market. At 85 per cent capacity the same plants would produce 45 per cent of the ingot tons necessary for all the market requirements, with a net of 41 per cent available to the market after deducting an estimated 10 per cent for export.

The proposed syndicate would control 67.3 per cent of all present ingot capacity in the 11 western states and of the remainder 13.7 per cent is included in present facilities of the Columbia Steel Co. and 13 per cent in Bethlehem's three coast mills.

WOMAN IN FOUNDRY: ***Some of the men molders have had to get busy to keep this girl from making more molds than they were accustomed to making.***

Sloss Sheffield photo.

Materials Stockpiling Exception Clarified By Interpretation

Washington

• • • **WPB has issued** Interpretation 17 to PR-1 clarifying the materials stockpiling exception for civilian production.

PR-1 provides that a person may receive, in anticipation of starting or resuming civilian production, the minimum quantity of material he would need during the first 30 days of such production, provided no priorities assistance is used to get such material. However, some misunderstanding has arisen among producers concerning this inventory exception, WPB officials said, and Interpretation 17 was issued for clarification purposes.

The interpretation points out that the 30-day quantity is a ceiling as far as advance stockpiling is concerned and may not be considered as a "bonus" to be added to the quantity of any material that the producer expects to have available for making his civilian product.

48 Industrial Plants And Sites Declared Available for Sale

Washington

• • • **Two blast furnaces** and a steel foundry, together with ore plants, are included in 48 industrial plants and sites which RFC has declared surplus and available for sale or lease. One of the blast furnaces has been operated by the Pittsburgh Steel Co. at Monessen, Pa., and the other by the Pittsburgh Ferro-Manganese Co., Chester, Pa. The foundry to be sold has been operated by the American Rolling Co., Middletown, Ohio.

The blast furnace plant at Monessen occupies 35,000 sq ft of space and equipment in eight buildings, includes a blower engine house and one 30-ton, one 15-ton and one 10-ton crane. The Chester furnace, out of blast for some time, has complete equipment. The foundry at Middletown, which produces heavy steel castings weighing up to 120 tons, also is complete with such equipment as a 75-ton traveling crane, an electric traveling crane, coke oven swing grinders, jarring machine, portable tools, etc.

Other properties declared surplus are:

Former Operator and Plant Location	Type	Product
American Rolling Mill Co. Middletown, Ohio	Complete 18,525 sq ft	Steel Castings
Anaconda Copper Mining Co. Columbus, Mont.	Complete	Chrome
Anaconda Copper Mining Co. Columbus, Mont.	Mining	Chrome Ore
Anaconda Alloys Corp. Columbus, Neb.	Temporary Constr. Uncompleted Approx. 93 acres	——
Manganese Ore Co. Las Vegas, Nev.	Complete 69,100 sq ft	Process Manganese Oxide Nodules
Alan Wood Steel Co. Ringwood Manor, N. J.	Complete—878 acres 90,000 sq ft	Iron Ore
Great Lakes Carbon Company Chicago	Complete 2,650 sq ft	Calcined Petroleum Coke
Mathieson Alkali Works, Inc. Lake Charles, La.	Complete 480,000 sq ft	Magnesium. Several buildings being leased to Dunn Construction Co.
Panaminas, Inc. Paytes, P. O., Va.	Complete 5,700 sq ft	Zinc, Lead and Copper Sulphate Concentrates
Wilkeson Products Co. Tacoma, Wash.	Complete Plant 6,305 sq ft	Metallurgical Coke
Pilgrim Ordnance Works West Hanover, Mass.	135 Buildings 34,256 sq ft	Grinding Magnesium
Die-Typing Corp. Pontiac, Mich.	Complete 30,200 sq ft	Drop Forged Dies
Escanaba By-Pass Project Escanaba, Mich.	Uncompleted Docks and Approaches	By-Pass for Iron Ore
Ford Motor Co. Dearborn, Mich.	Complete 39,000 sq ft	Turbo Superchargers
Southwestern Engineering Co. Marshfield, Ore.	Complete 8,740 sq ft	Chrome Concentrates
United Engineering & Foundry Co. Troutdale, Ore.	Land—Approx. 114 acres	——
Benjamin Franklin Graphite Co. Chester Springs, Pa.	Complete—70 acres 9,588 sq ft	Graphite
National Carbon Company, Inc. Wilkes-Barre, Pa.	Complete Plant 11,400 sq ft	Amorphus Carbon
Warner Co. Philadelphia	Complete Plant Approx. 26,000 sq ft	Magnesite
Reynolds Metals Co. Memphis, Tenn.	Land—Warehouse 22,000 sq ft Approx. 270 acres	——
Southern Ferro Alloys Co. Chattanooga, Tenn.	Complete 11,700 sq ft	Ferrosilicon

Describes Replacement Of War Allotments For Some Civilian Items

Washington

• • • **A method by** which manufacturers of construction machinery and diesel engines may continue to use military allotments of controlled materials and preference ratings that they have received from their customers in the production of these items for civilian use after the customer has canceled the related order was outlined July 10 by WPB.

The instructions are contained in Direction 70 to CMP Regulation 1. The amended direction is intended to minimize the rescheduling and reordering that otherwise would be necessary in connection with the change from military to civilian production.

Direction 70, issued June 7, previously gave instructions for a manufacturer's handling of military cancellations of Class A civilian type end products, which are a limited list of products for which both the claimant agencies and WPB allot controlled materials. The amended direction applies only to specific kinds of Class A civilian type end products.

It applies only to the manufacturer of the complete product listed below and not to the manufacturer of any component of any such product:

Tractor mounted construction equipment; specialized construction machinery; construction material mixers, pavers, spreaders and related equipment; construction material processing equipment; power cranes, derricks, draglines, dredges, shovels and related equipment; scrapers and graders; drilling, boring machinery; earth, rock, including water well drilling; tracklaying tractors; diesel electric or diesel mechanical locomotives, under 600 hp.

John N. Moylan Retires

Chicago

• • • **After 45 years** of service, John N. Moylan, assistant treasurer of the American Steel and Wire Co., is retiring. At the same time Walter V. Farr has been elected to succeed Mr. Moylan and Samuel M. Rankin has been appointed credit manager in this district, succeeding Mr. Farr.

Mr. Farr first started with the company in 1934 as an engineer and has been located in Chicago since 1942.

Change Rule on Steel Further Conversions

Washington

• • • A change of CMP policy concerning "FC" allotments for use in connection with further conversion of steel from one form to another was announced by WPB on July 17.

WPB had previously stated on June 1 that effective July 1 "FC" allotments for further conversion of steel would no longer be issued on CMP-4B applications filed by producers not operating under production directives and that all such allotments for the third and subsequent quarters were canceled.

Directive 71 to CMP Regulation 1, however, was amended to provide that an order placed against a previously granted allotment and accepted for third quarter delivery shall be considered as bearing the allotment symbol "FC-1."

A producer may use this symbol, WPB said, to replace steel on the same product group, as listed in Schedule 1 of CMP Regulation 1, that was used as conversion material to fill authorized controlled materials orders.

No Prior Clearances For Railroad Orders

Washington

• • • Orders for new locomotives and railroad type cars may now be accepted and scheduled by manufacturers without prior clearances, WPB has announced. However, such orders may not interfere with outstanding delivery directions that remain in effect.

Control over production of new locomotives and new railroad type cars was removed through the revocation of orders L-97 and L-97a and an amendment covering transportation equipment in the general scheduling order, M-293, Table 18.

To insure space in schedules for critical and urgent orders, steam locomotives, diesel-electric locomotives of 600 HP and over, freight cars over 10 tons capacity and passenger cars have been listed in Table 18 as designated products. This action does not interfere with the placing and acceptance of orders or the scheduling of production by the manufacturer unless rescheduling becomes necessary to insure delivery for the highly essential needs of the military services or war-supporting agencies.

Under the provisions of M-293, Paragraph P, a manufacturer need not file a schedule on form WPB-3809.7 unless he is directed to do so, although WPB's Transportation Equipment Division would like to receive full information on production and schedules from manufacturers as in the past.

WATCH THIS: *This button shows the individual was honorably discharged from the armed services.*

Stainless Open Ended; Permit Nickel Plating

Washington

• • • Indicative of the easing nickel supply situation, WPB will announce on July 19 the open ending of stainless steel and removal of restrictions on the use of nickel for plating and other industrial purposes.

Revocation of Direction 2 of Order M-21 will permit the placing of unrated orders for stainless steel and is in line with the relaxation of controls over other controlled materials, WPB points out.

Order M-6-B, which restricted the use of nickel except for war goods and other specified articles and products, included a list of prohibited uses such as plating of hardware and plumbing.

Order M-6-A regulating delivery and acceptance of nickel will remain unchanged.

Tinplate Record Set By C-I Irvin Works

Pittsburgh

• • • Emphasizing the rapid progress in electrolytic tinplate manufacture, the Irvin Works of Carnegie-Illinois Steel Corp. in June established an all-time high electrolytic tinplate production record. Operating at 114 per cent of capacity, it turned out enough of this light coated plate to provide 170 million standard size tin containers for food. This was 25 million more than could have been manufactured from the best previous monthly tonnage, a record made in May on the lines at the same plant.

Altogether, U. S. Steel subsidiaries in Pittsburgh, Chicago, and Birmingham have produced since Pearl Harbor enough electrolytically coated tinplate for 7½ billion cans, and this method, pioneered by U. S. Steel Corp., resulted in the saving of nearly 9 million lb. of tin during this period.

Gilded Metal Becomes Surplus Material

Pittsburgh

• • • Complete curtailment of the clad metal bullet jacket program was evidenced this week when Superior Steel Corp., Carnegie, Pa., showed considerable quantities of both the gilded strip steel and the hot rolled steel bars from which it is made in surplus disposal lists of the Army Ordnance Dept. Superior Steel Corp. held the patents on the manufacture of gilded metal, which is strip steel with a copper-zinc alloy coating on both sides.

While Superior held these patents, they were loaned royalty free to many other manufacturers in order to boost production of this once critical war item. Clad metal was furnished Great Britain, China, Russia, and Canada in substantial quantities, and during 1943 the American forces were supplied with ammunition made from it. However, the program was practically abandoned during 1944, and it wasn't until January 1945, that it was resumed. *(Ed. Note: See* THE IRON AGE, *Jan. 11, 1945, page 87).*

While the need for clad metal bullet jackets was critical in the first few months of this year, the demand tapered off rather sharply, and the program was again dropped a few weeks ago when small caliber ammunition contracts were cut back. Superior Steel Corp., one of the last producers to be cut back, is now offering on the surplus lists 348 tons (1800 coils) of 4-29/32 x 0.101-in. gilded strip steel in 375 to 400 lb coils. The gilding metal is 0.01515 in. thick (15 pct) on one side and 0.00505 in. thick (5 pct) on the other. In addition, also for sale are two lots of the flat H-shaped section used in rolling gilded metal. These lots consist of 837 tons of 10 ft bars and 71 tons of 5 ft bars.

In a subsequent surplus list, there was also offered 20½ tons of 5 x 0.500 x 116-in. gilding metal slabs, copper alloy coated on both sides, and 25½ tons of 5 x 0.160 x 116-in. gilding metal slabs, copper coated both sides.

Offer Finishing Equipment

New York

• • • Surplus electroplating and anodizing equipment, tinning, galvanizing and pickling equipment is offered in List No. 160 by the local office of RFC located at 70 Pine St., New York 5.

U.S. Steel-USWA Board Set Up With Chicago Labor Expert As Head

Chicago

• • • Intensive experience in labor arbitration work is brought to the newly established joint USWA-Steel Corp. Conciliation and Arbitration Board by the presence of public member Dr. Herbert G. Blumer, Chicago University Sociology Professor. The board started operations in Pittsburgh this week where offices will be established in Room 1409, Chamber of Commerce Building.

Other members of the board, set up as a result of a clause in the new USWA-U. S. Steel Corp. contract Mar. 13 are Walter J. Kelley, manager of industrial relations Tennessee Coal, Iron & R. R. Co., representing management, and Eugene Maurice, of the International Office staff of the USWA. The board will serve as a "Court of Last Resort" for grievances brought through regular channels and sent to arbitration, and has broad powers in the conciliation field, according to the contract.

Dr. Blumer as the chairman of the permanent board, will be the key member of the group and has obtained a leave of absence from his teaching duties for the duration of the agreement, which ends in October, 1946.

He has recently been arbitrator between the American Steel and Wire Co., and Carnegie-Illinois Steel Corp. and the United Steel Workers of America, CIO. The decisions on the last of approximately 40 grievances in the case of the American Steel and Wire Co., probably his most important case in the steel industry, have just been completed. The new board will have jurisdiction over these companies, as well as Columbia Steel Co., Tennessee Coal, Iron & R. R. Co., and National Tube Co.

Positions as permanent arbitrator for the Armour Co., and as chairman of a public panel of the sixth regional WLB are also being resigned by Dr. Blumer as he takes up his new tasks. His work with both these organizations was undertaken after he returned from a government position in 1943. While in Washington he was principal liaison officer of the OWI to the OEW lend lease, and the United Nations Rehabilitation and Relief Administration. Although he was called in for work in some local arbitration in the early thirties his first important case was in 1943 between the Electric Autolite Co., and the UAW-CIO at Lacrosse, Wis. A later case was between the Chicago Screw Co., located here, and the UAW-CIO.

Dr. Blumer's first contact in arbitration circles with the USWA was in the case between that union and the Chicago Hardware Foundry Co., located in North Chicago. His initial experience in the steel industry was gained when he was called as arbitrator on issues between the Inland Steel Co., and the USWA in Oct., 1944.

Mr. Kelly has been employed at TCI since 1923, originally in foundry work, and later since 1940, as manager of industrial relations work there. Mr. Maurice, representing the USWA, has been active in steelworker's affairs for the past eight years, formerly as Youngstown District 12 director, and more recently in staff capacities for the International.

American Iron & Steel Institute Capacity, Production and Shipments

STEEL PRODUCTS	Number of Companies	Items	Maximum Annual Potential Capacity, Net Tons	YEAR 1944 REVISED			
				Production		Shipments (Net Tons)	
				Net Tons	Per Cent of Capacity	Total	To Members of the Industry for Conversion into Further Finished Products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	51	1				8,701,186	2,747,778
Structural shapes (heavy)	11	2	9,429,250	*3,817,413	41.9	3,835,601	
Steel piling	4	3		137,662		132,513	
Plates (sheared and universal)	27	4	17,583,220	*13,091,372	74.5	12,866,213	625,061
Skelp	6	5				839,189	668,274
Rails—Standard (over 60 lbs.)	4	6	3,625,000	2,305,303	63.6	2,290,779	
—All other	6	7	526,000	*185,353	35.2	192,671	
Splice bars and tie plates	13	8	1,747,260	*769,672	44.1	789,295	
Track spikes	10	9	350,640	147,376	42.0	156,260	
Hot Rolled Bars—Carbon	39	10		*8,695,959		7,121,278	933,526
—Reinforcing							
—New billet	15	11		543,828		573,998	
—Rerolled	14	12		67,342		79,524	
—Alloy	25	13		*3,044,550		2,241,525	237,667
TOTAL	47	14	22,264,720	*12,351,479	55.5	10,016,325	1,171,193
Cold Finished Bars—Carbon	24	15		1,786,599		1,775,046	
—Alloy	23	16		*414,336		372,927	
TOTAL	30	17	2,940,910	*2,200,935	74.8	2,147,973	
Tool steel bars	17	18	271,460	147,369	54.3	141,884	
Pipe and Tubes—Butt weld	16	19	2,162,529	1,435,674	66.4	1,437,910	
—Lap weld	8	20	842,200	577,602	68.6	574,242	
—Electric weld	10	21	1,344,900	859,329	63.9	857,119	
—Seamless	15	22	2,678,100	*2,355,069	87.9	2,356,483	
—Conduit	7	23	187,000	63,596	34.0	63,489	
—Mechanical tubing	12	24	1,117,600	*854,441	76.5	*842,291	
Wire rods	27	25	7,058,470	4,610,251	65.3	1,365,127	435,453
Wire—Drawn	42	26	5,653,440	3,652,728	61.6	2,178,345	104,294
—Nails and staples	19	27	1,249,020	642,497	51.4	635,388	
—Barbed and twisted	15	28	546,390	253,788	46.4	251,990	
—Woven wire fence	16	29	1,106,200	384,879	34.8	382,205	
—Bale ties	12	30	152,500	75,235	49.3	79,156	
Black Plate—Ordinary	9	31				489,222	1,504
—Chemically treated	8	32	464,000	*125,443	27.0	120,695	
Tin and Terne Plate—Hot dipped	9	33	3,718,850	*1,992,435	53.6	2,000,317	
—Electrolytic	10	34	2,173,850	*634,780	29.2	604,968	
Sheets—Hot rolled	29	35	19,536,820	*12,292,269	62.9	6,413,344	300,965
—Cold rolled	12	36	7,072,260	3,826,140	54.1	2,031,477	
—Galvanized	16	37	2,892,130	1,389,866	48.1	1,378,077	
Strip—Hot rolled	23	38	7,117,390	*2,671,432	37.5	1,703,148	264,621
—Cold rolled	36	39	3,146,110	1,270,281	40.4	1,191,365	
Wheels (car, rolled steel)	5	40	319,400	*292,041	91.4	*291,343	
Axles	6	41	408,170	186,921	45.8	184,728	
All other	5	42	168,790	*56,406	33.4	*51,675	
TOTAL STEEL PRODUCTS	155	43				*69,590,691	6,319,143
Effective steel finishing capacity	155	44	64,722,000				
Per cent of shipments to effective finishing capacity	155	45				97.9%	

*Revised

WPB Steel Division Executives Return To Civilian Positions

Washington

• • • Further "open ending" at WPB came to light July 12 at a farewell party given in honor of seven Steel Division executives who have resigned and are expected to leave before Aug. 1. This was in line with the impending decrease in the division's activities as a result of gradual lifting of wartime controls.

Those resigning included Harry M. Francis, Deputy Director; Clark King, Special Assistant to the Director; George F. Hocker, Chief of the Forgings and Castings Branch; R. W. Shannon, Vice Chairman of the Production Directive Committee; Walter O. Meloy, Chief of the Shell Steel Section; Robert A. Marble, Chief of the Shape Section and G. Russell Link, Deputy Chief of the Warehouse Branch.

Although the appointments have not been announced, it is reported that R. F. Sentner, Assistant Director for Production, will succeed Mr. Francis as Deputy Director and P. J. Treacy, Chief of Allocations and Allotment Section will be the new Assistant to the Director succeeding Mr. King.

Mr. Francis, who has been connected with the Steel division since May 1942, will return to his position as assistant to the vice president in charge of sales of the American Steel & Wire Co., Cleveland. Mr. King whose service dates back four years to WPB's predecessor agency, OPM, was formerly with the Bethlehem Steel Co., Bethlehem, Pa., and will be affiliated with Allegheny-Ludlum Steel Corp., Brackenridge, Pa.

Mr. Meloy, who joined the Steel Division staff in November 1944, to assist in the then critical shell steel program will resume his position as assistant to the manager of the carbon bar and finished sales department of Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Marble who ends three years' service with the Steel Division will also return to Carnegie-Illinois as manager of the sales engineering department.

Mr. Link was connected with the Chicago Warehouse of the Jones & Laughlin Steel Corp. before coming to WPB in June 1942, has accepted a position with the Universal Steel Co., Cleveland. Mr. Shannon was with the American Sheet & Tin Plate Co., Philadelphia for 16 years after which he headed the Eversteady Table Co., Birmingham, before coming with the Steel Division under OPM in June 1941.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period May - 1945

Steel Products	Number of Reports Received	Line	Maximum Annual Potential Capacity Net Tons	Current Month: Production Net Tons	Current Month: Production Per cent of capacity	Current Month: Shipments (Net Tons) Total	Current Month: Shipments (Net Tons) To members of the industry for conversion into further finished products	To Date This Year: Production Net Tons	To Date This Year: Production Per cent of capacity	To Date This Year: Shipments (Net Tons) Total	To Date This Year: Shipments (Net Tons) To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	24	1	xxxx	xxxx	xxx	614,738	208,555	xxxx	xxx	3,933,731	987,805
Structural shapes (heavy)	11	2	9,580,350	313,364	40.6	316,242	xxxx	1,378,806	37.4	1,405,449	xxxx
Steel piling	3	3		17,126		18,674	xxxx	104,687		107,433	xxxx
Plates (sheared and universal)	27	4	17,841,320	762,519	50.5	739,008	52,885	3,771,146	51.1	3,696,047	239,984
Skelp	6	5	xxxx	xxxx	xxx	68,742	31,638	xxxx	xxx	319,045	179,151
Rails—Standard (over 60 lbs.)	4	6	3,669,000	190,282	61.0	185,152	xxxx	926,900	61.0	917,450	xxxx
—All other	5	7	512,000	17,432	40.1	14,817	xxxx	76,803	36.2	75,652	xxxx
Splice bars and tie plates	12	8	1,745,960	67,379	45.4	66,959	xxxx	320,467	44.3	327,908	xxxx
Track spikes	10	9	349,400	13,318	44.9	13,526	xxxx	64,581	44.7	66,339	xxxx
Hot Rolled Bars—Carbon	37	10	xxxx	778,345	xxx	616,315	90,574	3,764,161	xxx	2,954,639	452,310
—Reinforcing—New billet	13	11	xxxx	53,665	xxx	52,438	xxxx	248,555	xxx	251,552	xxxx
—Rerolled	13	12	xxxx	9,885	xxx	7,771	xxxx	32,363	xxx	32,868	xxxx
—Alloy	24	13	xxxx	270,365	xxx	197,387	24,987	1,348,390	xxx	984,941	120,843
—Total	46	14	22,381,700	1,112,260	58.5	875,911	115,561	5,393,469	58.2	4,204,000	573,153
Cold Finished Bars—Carbon	23	15	xxxx	162,183	xxx	167,535	xxxx	767,351	xxx	771,984	xxxx
—Alloy	25	16	xxxx	40,362	xxx	35,730	xxxx	194,861	xxx	178,667	xxxx
—Total	32	17	3,015,910	202,545	79.0	203,265	xxxx	962,212	77.1	950,651	xxxx
Tool steel bars	17	18	275,010	13,071	56.4	13,133	xxxx	60,746	55.8	60,884	xxxx
Pipe & Tubes—Butt weld	16	19	2,232,520	137,866	72.7	130,900	xxxx	639,637	69.2	613,974	xxxx
—Lap weld	9	20	830,200	49,831	70.6	51,100	xxxx	230,353	67.0	234,661	xxxx
—Electric weld	11	21	1,570,900	91,327	68.4	79,795	xxxx	442,181	68.0	386,738	xxxx
—Seamless	16	22	3,377,700	275,422	95.3	229,376	xxxx	1,320,088	94.4	1,055,885	xxxx
—Conduit (cap. & prod. incl. above)	7	23	xxxx	xxxx	xxx	6,804	xxxx	xxxx	xxx	35,936	xxxx
—Mech. tubing (cap. & prod. incl. above)	12	24	xxxx	xxxx	xxx	71,513	xxxx	xxxx	xxx	339,916	xxxx
Wire rods	28	25	7,266,670	406,730	65.9	113,278	32,768	1,950,714	64.9	547,530	174,589
Wire—Drawn	41	26	5,664,690	319,817	66.5	199,809	6,989	1,556,406	66.4	936,569	39,866
—Nails and staples	19	27	1,253,360	53,553	50.3	52,206	xxxx	253,930	49.0	253,695	xxxx
—Barbed and twisted	15	28	539,610	21,541	47.0	21,678	xxxx	101,577	45.5	100,433	xxxx
—Woven wire fence	16	29	1,113,860	30,393	32.1	30,404	xxxx	156,788	34.0	155,731	xxxx
—Bale ties	12	30	149,700	7,046	55.4	7,632	xxxx	30,885	49.8	33,940	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	44,435	674	xxxx	xxx	218,283	2,333
—Chemically treated	8	32	465,000	11,485	29.1	9,850	xxxx	53,731	27.9	47,545	xxxx
Tin and Terne Plate—Hot dipped	10	33	3,795,850	186,041	57.7	182,154	xxxx	846,976	53.9	908,866	xxxx
—Electrolytic	10	34	2,251,850	79,500	41.9	78,464	xxxx	352,128	38.1	369,568	xxxx
Sheets—Hot rolled	29	35	19,197,320	1,220,248	74.8	614,591	46,978	5,648,696	71.1	2,905,347	192,002
—Cold rolled	12	36	7,131,460	398,119	65.7	242,715	xxxx	1,846,582	62.6	1,082,637	xxxx
—Galvanized	16	37	2,915,130	160,402	64.8	158,591	xxxx	748,336	62.0	743,142	xxxx
Strip—Hot rolled	24	38	7,055,390	246,471	41.1	140,539	24,956	1,164,140	39.9	718,568	118,377
—Cold rolled	35	39	3,119,850	120,136	45.3	112,217	xxxx	602,333	46.6	567,302	xxxx
Wheels (car, rolled steel)	5	40	319,400	26,555	97.1	26,020	xxxx	125,755	95.1	124,426	xxxx
Axles	6	41	408,170	13,609	39.2	14,967	xxxx	62,133	36.8	63,293	xxxx
All other	5	42	190,490	4,192	25.9	3,850	xxxx	20,148	25.6	18,846	xxxx
TOTAL STEEL PRODUCTS	152	43	xxxx	xxxx	xxx	5,938,035	521,004	xxxx	xxx	28,225,620	2,507,260
Effective steel finishing capacity	152	44	67,510,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	152	45	xxxx	xxxx	xxx	94.7 %	xxxx	xxxx	xxx	99.4 %	xxxx

During 1944 the companies included above represented 99.0% of the total output of finished rolled steel products as reported to American Iron and Steel Institute.

WLB Steel Commission At Pittsburgh Makes New Wage Rulings

Washington

• • • **In a statement** regarding its jurisdiction, the Steel Commission of the War Labor Board, with headquarters in Pittsburgh, has announced that a list of seven steel companies has been added to those covered by its Nov. 24, 1944 directive order in the Basic Steel Case. The order established the commission for the purpose of passing upon agreements on the elimination of intraplant wage rate inequities.

The seven companies added to the list are the American Rolling Mill Co., including its plants at Ashland, Ky., and Hamilton and Zanesville, Ohio, and the Middletown, Ohio, general offices and research organization; The Great Lakes Steel Corp., Ecorse, Mich.; The Harrisburg Steel Corp., Harrisburg, Pa.; The Missouri Rolling Mills, St. Louis; Weirton Steel Co., Weirton, W. Va.; The Republic Steel Corp., Dilworth Porter Plant, Pittsburgh, Elyria, Ohio, and Gary, Ind. plants and the Tuscon Steel Co., Youngstown. The commission said that the American Rolling Mill and Great Lakes Steel plants are not represented by the United Steel Workers.

The commission said that it has jurisdiction only over those companies specifically named in the directive order and such additional companies as the board has from time to time designated.

Employees subject to the commission's jurisdiction, it was pointed out, apply to production and maintenance workers. Cases involving other groups of employees such as foremen and office workers not in the bargaining unit of the companies designated in the order are not within the jurisdiction of the commission unless specifically included by direction of the board.

Explaining it was established solely for the purpose of resolving disputes involving the elimination of intraplant wage disputes, the commission said it does not have jurisdiction over any other types of adjustments, such as, for example vacations, sick leave, etc.

"Nor does the commission have jurisdiction," said the statement, "over the establishment of rates for a new plant or a new department within an existing plant or the introduction of an existing incentive or piece rate plan requiring War Labor Board approval except where such cases involve the correction of intraplant inequities. Rates for new jobs or changed jobs whether hourly or incentive, can be made, of course, without the approval of the board agency if pursuant to general orders 6 and 38."

Cold Finished Steel Price Change Seen

New York

• • • **The Office of Price Administration** is expected soon to announce a decrease in the base price of cold finished bars and shafting. However, the change in the base price of this item will be compensated for by revisions in the list of extras. It is expected that the net change will not mean a loss to steel companies.

This action, which may come in the latter part of this week, carries out the OPA's implication that some steel prices would be reduced. The contemplated change in the extras may be a forerunner of further changes in extras for other steel products in a major effort to base such extra charges on actual production costs.

Allentown Plan "Reversed"

Allentown, Pa.

• • • **The War Manpower Commission** recently began putting its "Allentown Plan" in reverse here. This city was the first in the nation in which workers were transferred from less essential to war vital industry.

Dr. Frank P. Maguire, area WMC director, said "the men affected by such emergency transfers are permitted to return to their former employer," pointing out "the emergency for which male workers were transferred from less essential establishments to war essential establishments under the Allentown plan has been overcome in the majority of instances."

Two stipulations were noted. The worker must desire to return to his original employer and the WMC must readjust the employment ceiling of his initial employer.

AMERICAN IRON AND STEEL INSTITUTE

Production of Open Hearth, Bessemer and Electric Steel Ingots and Steel for Castings

YEAR 1945

Based on Reports by Companies which in 1944 made 97.9% of the Open Hearth, 100% of the Bessemer and 86.7% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,468,815	90.5	379,062	76.0	358,346	77.3	7,206,223	88.8	1,626,687	4.43
February	5,967,842	92.4	347,227	77.1	339,520	81.1	6,654,589	90.8	1,663,647	4.00
March	6,927,377	96.9	398,351	79.8	382,237	82.4	7,707,965	95.0	1,739,947	4.43
1st Quarter	*19,364,034*	*93.3*	*1,124,640*	*77.6*	*1,080,103*	*80.2*	*21,568,777*	*91.6*	*1,677,199*	*12.86*
April	6,541,097	94.4	372,952	77.2	377,877	84.1	7,291,926	92.8	1,699,750	4.29
*May	6,662,827	93.2	402,100	80.6	385,876	83.2	7,450,803	91.8	1,681,897	4.43
†June	6,159,348	88.9	379,828	78.6	329,541	73.4	6,868,717	87.4	1,601,100	4.29
† *2nd Quarter*	*19,363,272*	*92.2*	*1,154,880*	*78.8*	*1,093,294*	*80.3*	*21,611,446*	*90.7*	*1,661,141*	*13.01*
† *1st 6 Months*	*38,727,306*	*92.7*	*2,279,520*	*78.2*	*2,173,397*	*80.3*	*43,180,223*	*91.1*	*1,669,123*	*25.87*
July										4.42
August										4.43
September										
3rd Quarter										

YEAR 1944

Based on Reports by Companies which in 1944 made 97.9% of the Open Hearth, 100% of the Bessemer and 86.7% of the Electric Ingot and Steel for Castings Production

Period	Estimated Production—All Companies								Calculated weekly production, all companies (Net tons)	Number of weeks in month
	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL			
	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity	Net tons	Percent of capacity		
January	6,770,423	97.2	439,551	85.4	382,629	84.4	7,592,603	95.7	1,713,906	4.43
February	6,410,914	98.5	409,781	85.2	373,314	88.1	7,194,009	97.0	1,737,683	4.14
March	6,977,466	100.1	455,368	88.5	393,423	86.8	7,826,257	98.6	1,766,649	4.43
1st Quarter	*20,158,803*	*98.6*	*1,304,700*	*86.4*	*1,149,366*	*86.4*	*22,612,869*	*97.1*	*1,739,451*	*13.00*
April	6,789,422	100.6	437,472	87.8	366,794	83.5	7,593,688	98.8	1,770,090	4.29
May	6,879,253	98.7	437,444	85.0	385,879	85.1	7,702,576	97.1	1,738,730	4.43
June	6,463,049	95.8	419,699	84.2	351,509	80.1	7,234,257	94.1	1,686,307	4.29
2nd Quarter	*20,131,724*	*98.4*	*1,294,615*	*85.6*	*1,104,182*	*82.9*	*22,530,521*	*96.7*	*1,731,785*	*13.01*
1st 6 months	*40,290,527*	*98.5*	*2,599,315*	*86.0*	*2,253,548*	*84.7*	*45,143,390*	*96.9*	*1,735,617*	*26.01*
July	6,743,812	96.6	415,543	80.9	339,032	74.6	7,498,387	94.3	1,696,468	4.42
August	6,715,835	95.9	429,672	83.5	353,406	77.6	7,498,913	94.1	1,692,757	4.43
September	6,501,944	96.1	398,058	80.1	335,109	76.2	7,235,111	94.0	1,690,446	4.28
3rd Quarter	*19,961,591*	*96.2*	*1,243,273*	*81.5*	*1,027,547*	*76.2*	*22,232,411*	*94.1*	*1,693,253*	*13.13*
9 months	*60,252,118*	*97.7*	*3,842,588*	*84.5*	*3,281,095*	*81.8*	*67,375,801*	*96.0*	*1,721,405*	*39.14*
October	6,860,921	98.0	420,105	81.6	339,859	74.7	7,620,885	95.6	1,720,290	4.43
November	6,572,454	97.0	403,908	81.0	302,357	68.6	7,278,719	94.3	1,696,671	4.29
December	6,678,460	95.6	373,322	72.7	314,388	69.2	7,366,170	92.6	1,666,554	4.42
4th Quarter	*20,111,835*	*96.9*	*1,197,335*	*78.4*	*956,604*	*70.8*	*22,265,774*	*94.2*	*1,694,503*	*13.14*
2nd 6 months	*40,073,426*	*96.5*	*2,440,608*	*80.0*	*1,984,151*	*73.5*	*44,498,185*	*94.2*	*1,693,878*	*26.27*
Total	80,363,953	97.5	5,039,923	83.0	4,237,699	79.0	89,641,575	95.5	1,714,644	52.28

Note—The percentages of capacity operated are calculated on weekly capacities of 1,372,755 net tons open hearth, 116,182 net tons Bessemer and 102,350 net tons electric ingots and steel for castings, total 1,781,287 net tons; based on annual capacities as of Jan. 1, 1945 as follows: Open hearth 82,223,610 net tons, Bessemer 6,074,000 net tons, Electric 5,350,580 net tons. Beginning July 1, 1944, the percentages of capacity operated are calculated on weekly capacities of 1,380,042 net tons open hearth, 116,182 net tons Bessemer and 102,787 net tons electric ingots and steel for castings, total 1,598,981 net tons; based on annual capacities as follows: Open hearth 82,604,690 net tons, Bessemer 6,074,000 net tons, Electric 5,372,190 net tons.

WPB Grants a Ten Day Delay to Contractors In Canceling Ratings

Washington

• • • WPB on July 12 ruled that a contractor who is using his customer's military ratings to get production material is permitted to delay 10 days in canceling such ratings, if necessary, to permit an orderly transfer of production from one customer to another.

The action, outlined in Direction 8 to PR-1, provides that any person manufacturing a product on orders from the Army, Navy or Maritime Commission, or who is using the ratings identified by the CMP allotment symbols W, O, N, M or C to obtain production materials may delay for 10 days canceling use of such preference ratings when the contract or purchase order is canceled or cut back. If he receives a rated order for the same product, he must promptly rerate all his outstanding orders to the rating applicable to the new order, if the new rating is lower.

The direction adds that such a manufacturer, during the 10-day period, may continue manufacturing the product covered by the canceled contract as though he still had the original contract. However, if at the expiration of 10 days he has not received a rated order for the same product, he must promptly cancel all use of the preference rating and reschedule his own production in accordance with PR-1.

Direction 8 concludes with the caution that nothing in the direction shall be construed to constitute an assumption of liability by any person or agency for any production pursuant to the direction.

Ford and Foremen's Assn. Extend Their Contract

Detroit

• • • Ford Motor Co. and the Foremen's Assn. of America, independent union of supervisors, have arranged an extension to their bargaining contract, under which unsettled dispute cases will be referred to an impartial umpire, to be selected shortly.

The umpire's office will be the third step of the grievance procedure. The first is discussion between the foreman and his building superintendent, and the second is a hearing on the case in the foremen's personnel office, maintained by the company to handle all grievance matters involving supervisors. If no satisfactory decisions are reached in this office, the dispute will henceforth be referred to the umpire rather than a joint appeal board consisting of representatives of the union and the company.

Primarily the umpire will settle any dispute issues in accordance with his interpretation of the bargaining contract. However, no cases may be taken to him without joint approval of both parties, the alternative being appeal to the War Labor Board.

Ford Motor Co. probably has today somewhere between 4000 and 5000 foremen covered by the agreement. When the contract was signed in May 1944, it covered 8200 men, but since then the shutdown of Willow Run has eliminated 2300 of these, and cutbacks at River Rouge — now being compensated by increased production on automobiles — have resulted in still other layoffs.

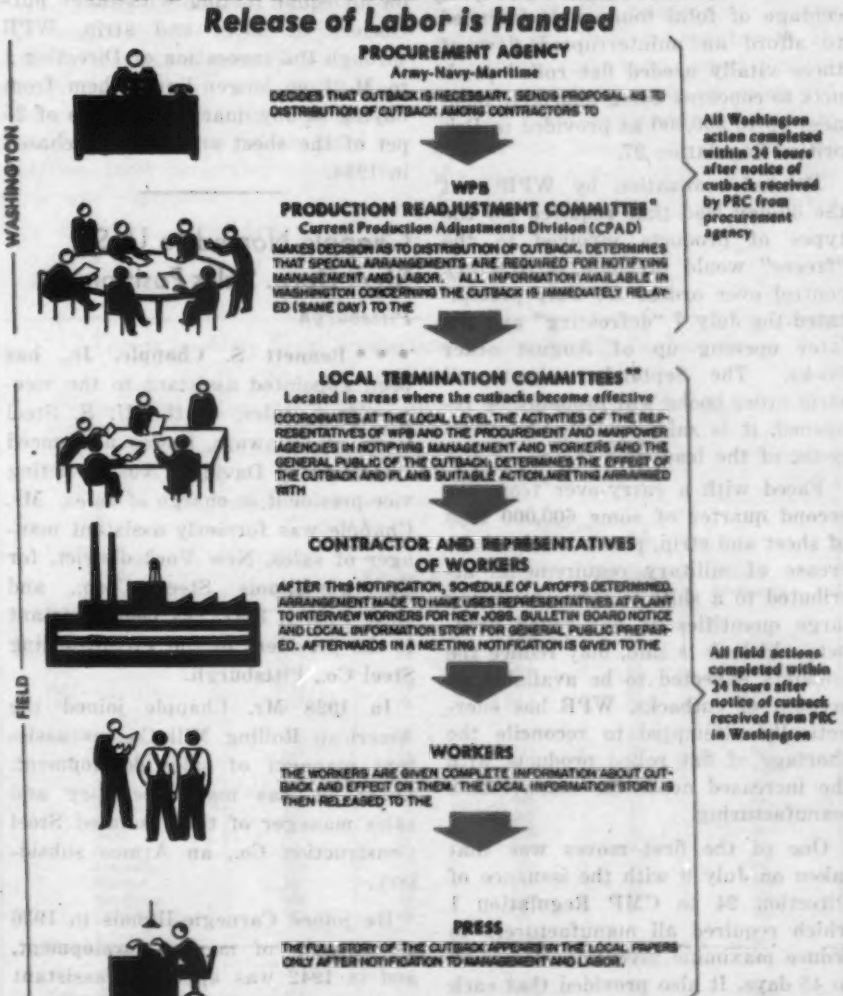
Westinghouse Starts Refrigerator Output

Springfield, Mass.

• • • Two new models of Westinghouse electric refrigerators for commercial use—first to be produced since the beginning of the war—are now in production, it was announced by H. F. Hildreth, manager, Refrigeration Specialties Department of the Electric Appliance Division.

Manufactured under WPB authorization, the refrigerators, 20 and 30 cu ft sizes—will be available to institutions, commercial and industrial markets having a priority of AA-5 or better. This includes hospitals, schools, colleges, grocery stores, cafeterias, restaurants, laboratories and similar institutions. Although restrictions on sale have recently been lifted by WPB, initial production must be directed to filling priority orders now on hand.

How a Cutback Which Involves Substantial Release of Labor is Handled


WASHINGTON
FIELD
PROCUREMENT AGENCY
Army-Navy-Maritime
DECIDES THAT CUTBACK IS NECESSARY, SENDS PROPOSAL AS TO DISTRIBUTION OF CUTBACK AMONG CONTRACTORS TO
WPB
PRODUCTION READJUSTMENT COMMITTEE*
Current Production Adjustments Division (CPAD)
MAKES DECISION AS TO DISTRIBUTION OF CUTBACK, DETERMINES THAT SPECIAL ARRANGEMENTS ARE REQUIRED FOR NOTIFYING MANAGEMENT AND LABOR. ALL INFORMATION AVAILABLE IN WASHINGTON CONCERNING THE CUTBACK IS IMMEDIATELY RELAYED (SAME DAY) TO THE
LOCAL TERMINATION COMMITTEES**
Located in areas where the cutbacks become effective
COORDINATES AT THE LOCAL LEVEL THE ACTIVITIES OF THE REPRESENTATIVES OF WPB AND THE PROCUREMENT AND MANPOWER AGENCIES IN NOTIFYING MANAGEMENT AND WORKERS AND THE GENERAL PUBLIC OF THE CUTBACK; DETERMINES THE EFFECT OF THE CUTBACK AND PLANS SUITABLE ACTION. MEETING ARRANGED WITH
CONTRACTOR AND REPRESENTATIVES OF WORKERS
AFTER THIS NOTIFICATION, SCHEDULE OF LAYOFFS DETERMINED. ARRANGEMENT MADE TO HAVE USES REPRESENTATIVES AT PLANT TO INTERVIEW WORKERS FOR NEW JOBS. BULLETIN BOARD NOTICE AND LOCAL INFORMATION STORY FOR GENERAL PUBLIC PREPARED. AFTERWARDS IN A MEETING NOTIFICATION IS GIVEN TO THE
WORKERS
THE WORKERS ARE GIVEN COMPLETE INFORMATION ABOUT CUTBACK AND EFFECT ON THEM. THE LOCAL INFORMATION STORY IS THEN RELEASED TO THE
PRESS
THE FULL STORY OF THE CUTBACK APPEARS IN THE LOCAL PAPERS ONLY AFTER NOTIFICATION TO MANAGEMENT AND LABOR.
All Washington action completed within 24 hours after notice of cutback received by PRC from procurement agency
All field actions completed within 24 hours after notice of cutback received from PRC in Washington

Thirty Day Lead Time Requires Reopening Of July and August Books

Washington

• • • Relaxation of the July 4 third quarter "freeze" of orders for specific types of steel sheet and strip so that it now applies only to September has been announced by WPB. In addition, mill order books were reopened for small manufacturers' orders bearing Z-3 symbols for the entire third quarter.

This action was embodied in Direction 75 to CMP Regulation 1 which reaffirmed WPB's telegraphic order of July 7 opening up July. These earlier actions although not covered by CMP Directions were not extra-legal, WPB officials say, pointing out that under CMP, industry divisions have authority to take emergency steps where needed.

The opening up of the entire third quarter for Z-3 symbol orders which account for a relatively small percentage of total tonnage is intended to afford an uninterrupted flow of these vitally needed flat rolled products to concerns doing quarterly business up to $50,000 as provided in Priorities Regulation 27.

Belated realization by WPB that the 30-day lead time required for the types of products involved in the "freeze" would preclude satisfactory control over orders for July precipitated the July 7 "defrosting" and the later opening up of August order books. The September sheet and strip order books will probably be reopened, it is said, by Aug. 1 on account of the lead time factor.

Faced with a carry-over from the second quarter of some 600,000 tons of sheet and strip, plus a minimal decrease of military requirements attributed to a shift to items requiring large quantities of flat rolled products which, it is said, may reduce the amounts expected to be available on account of cutbacks, WPB has energetically attempted to reconcile the shortage of flat rolled products with the increased needs for reconversion manufacturing.

One of the first moves was that taken on July 9 with the issuance of Direction 24 to CMP Regulation 1 which required all manufacturers to reduce maximum inventories from 60 to 45 days. It also provided that each steel producer shall report weekly all cancellations of orders for specified types of sheet and strip to be produced and delivered in the third quarter.

Earlier WPB had permitted steel producers effective July 6, to accept unrated and "Z" orders in favor of rated CMP orders after lead time had begun. Previously they were required to reject such orders both before and after the lead time. This is expected to step up the placing of unrated orders in spaces opened up as a result of cancellations.

Direction 76 to CMP Regulation 1, issued July 16, states that normally a change in allotment symbol does not constitute a new order. However, until further notice, a change in an allotment symbol on any order calling for delivery of the types of sheet and strip steel described in Direction 75 to CMP Regulation 1 in the third quarter will constitute a new order. A producer may accept such a change and keep the order in his schedule only when he is permitted to accept a new order by Direction 75.

So that warehouses may be placed on an equal footing with other purchasers of sheet and strip, WPB through the revocation of Direction 1 to M-21 no longer limits them from buying in any quarter in excess of 25 pct of the sheet and strip purchased in 1944.

Chapple Named to U. S. Steel Corp. Sales Position

Pittsburgh

• • • Bennett S. Chapple, Jr., has been appointed assistant to the vice-president, sales, of the U. S. Steel Corp. of Delaware, it was announced this week by David F. Austin, acting vice-president in charge of sales. Mr. Chapple was formerly assistant manager of sales, New York district, for Carnegie-Illinois Steel Corp., and since Feb. 1, 1944, has been assistant to the president of the Firth-Sterling Steel Co., Pittsburgh.

In 1928 Mr. Chapple joined the American Rolling Mill Co., as assistant manager of sales development. Later he was made secretary and sales manager of the Insulated Steel Construction Co., an Armco subsidiary.

He joined Carnegie-Illinois in 1936 as manager of market development, and in 1942 was appointed assistant to the vice-president, operations, in charge of emergency defense coordination.

Decline in Soft Coal Output Halted in May But Stocks Still Low

Washington

• • • Although a six-months-long decline in bituminous stocks was halted in May by seasonal influences, stockpiles on June 1 were only 215,000 tons above the lowest point since 1941, Solid Fuels Administrator Harold L. Ickes said recently.

Stocks of soft coal in the hands of industrial consumers and retail dealers on June 1 totaled an estimated 44,008,000 tons, Administrator Ickes said, or a 30-day supply at the May consumption rate. A month previously stocks were estimated at 43,793,000 tons, or a 30-day supply.

The stocks on June 1 were 21,066,000 tons less than they were on Nov. 1, 1944, when the uninterrupted decline began.

Administrator Ickes said that the relatively small increase in stockpiles in May, when ordinarily a substantial gain is reported in that month, was due to steady industrial activity and to cool weather, which resulted in continued use of coal for heating in many sections. Actually, consumption in May was slightly heavier than in April, but the April consumption by industry was abnormally low because of mine strikes, which reduced coal output and slowed many activities in that month, he said.

With low stockpiles and a threatening 25,000,000-ton gap between soft coal requirements and production, it is imperative that both domestic and industrial consumers accept every possible opportunity to build their stocks while coal is available during the warm months, the administrator said. In many sections alternative grade coals, which can be used currently while the better grades are stored, are now available and should be utilized.

In the first half of 1945, from Jan. 1 through June 30, production of bituminous coal totaled an estimated 297,555,000 tons, a decrease of 6.9 pct under the 319,647,000 tons produced between Jan. 1 and July 1, 1944.

Anthracite production in the first half of the year was estimated at only 26,677,000 tons, a decrease of 19 pct under the 32,953,000 tons produced in the first half of 1944. The largest part of this decrease was due to the prolonged anthracite strike in May, it was said.

Alloy Steel Output Still Far Above Prewar Status

New York

• • • Output of alloy steel in the first five months of 1945 maintained about the same relation to total steel production as during the same period of 1944. Even though there was a relative drop in the percent of alloy steel to total steel output during the last several months of 1944, changes in war program enabled a better participation for alloy steel so far this year.

Latest figures for June production, however, will probably reflect recent cutbacks in munition programs which will mean a smaller percentage of alloy steel output to total steel output than has been the case for several months.

An analysis of alloy steel production with respect to whether it was made in the openhearth or the electric furnace indicates several swings since January 1944. Before the war openhearths produced between 77 and 74 pct of the total alloy steel production. A rapid increase in electric steel capacity combined with heavy war demands cut this percentage to as low

By TOM CAMPBELL

o o o

as 64 pct in January 1944. Part of this change, however, was due to WPB orders in 1943 which shifted alloy output from openhearth furnaces to electric units. After this order was rescinded, the participation of the openhearths in alloy output increased.

The increased percentage of openhearth alloy steel as compared with electric furnace production continued from about March 1944 until April 1945. May 1945 figures, however, showed a slight gain in electric steel production of alloy steels but more recent statistics for June experience seem to indicate a greater fall-off in electric steel output. This trend may continue in view of the substantial cutbacks which have taken place in munition steel programs as well as other war contracts.

In view of the past few years' experience, however, it does not appear likely that the relative percentage of alloy steel to total steel production will regress to the prewar status which generally amounted to about 6 pct of total steel output. Nor does it appear that alloy steel output in the postwar era will reach the war period experience of close to 16 pct of total steel output which prevailed for several months during 1943.

The excess electric furnace capacity in the country will probably be one major factor tending to keep the percentage of openhearth alloy steel down from the prewar figures. Nevertheless, the experience which openhearth producers have had with alloy steel output is expected to furnish a strong incentive which will be the keystone of the competition in the postwar era between openhearth alloy output and electric steel production. Coupled with this situation will be the steel industry's attempt to combat the inroads to be made by the lighter metals with further perfections made or to be made in the alloy steel field.

Alloy Steel Production vs. Total Steel Output

1939-1945

Net Tons. 000 Omitted.

YEAR	Alloy Steel Production	Alloy Steel Per Cent of Total Steel	Total Steel Production
1939	3,212	6.1	52,799
1940	4,966	6.3	66,983
1941	8,206	9.9	82,839
1942	11,526	13.4	86,032
1943	13,116	14.8	88,873
1944—January	919	12.0	7,592
February	905	12.6	7,194
March	953	12.2	7,826
April	889	11.7	7,594
May	931	12.2	7,703
June	866	12.0	7,234
July	854	11.4	7,498
August	875	11.7	7,499
September	871	12.0	7,235
October	842	11.0	7,621
November	804	11.0	7,279
December	848	11.5	7,366
1944—Total	10,437	11.5	89,642
1945—January	908	12.6	7,206
February	832	12.0	6,855
March	922	12.9	7,708
April	918	12.6	7,292
May	897	12.0	7,477

Trends in Alloy Steel Production—Open hearth vs. Electric

1939-1945

Source—American Iron & Steel Institute. Compilation—The Iron Age
Net Tons. 000 Omitted

YEAR	ALLOY STEEL OUTPUT				
	O. H.		Electric		
	Production	Per Cent of Total	Production	Per Cent of Total	Total Production
1939	2452	77	753	23	3,212
1940	3679	74	1287	26	4,966
1941	5743	70	2453	30	8,206
1942	8133	71	3393	29	11,526
1943	9221	70	3995	30	13,116
1944—January	586	64	333	36	919
February	584	64	321	36	905
March	627	66	326	34	953
April	581	66	308	34	889
May	610	66	321	34	931
June	576	67	290	33	866
July	572	62	282	33	854
August	577	66	298	34	875
September	558	66	283	34	841
October	557	66	286	34	843
November	559	70	244	30	803
December	567	69	281	31	848
1944—Total	6974	66	3553	34	10,527
1945—January	610	67	298	33	908
February	578	67	285	33	863
March	669	67	323	33	992
April	596	65	323	35	919
May	574	64	323	36	897

Committee Recommends SPB Control Foreign Disposals

By L. W. MOFFETT

Washington

• • • Demand that the disposal of surpluses abroad should be under the direct control of the Surplus Property Board was made in an interim report submitted to the Senate on July 6 by Senator Harley M. Kilgore, Democrat of West Virginia, chairman of a Senate subcommittee which held hearings and inspected facilities and supplies in the European and Mediterranean theaters of operations.

The report declared that the United States government lacks assurance that the highest return is being obtained. An outstanding object of criticism was the policy for the disposal of machine tools abroad. On the floor of the Senate the report developed sharp discussion by Senator Homer Ferguson, Republican of Michigan, a member of the subcommittee, who dwelt at length on lend-lease as it applied to machine tools. He said he believed that an examination of lend-lease and particularly of reverse lend lease will disclose that in some cases there is a disregard of the property rights of the respective countries.

Senator Ferguson, discussing the sale to the United Kingdom on Jan. 19 by FEA of 58,000 lend-lease machine tools, originally valued at $166,000,000 at $31,500,000, declared that he is receiving complaints from Michigan by persons who say they are having difficulty in obtaining tools for refitting plants for civilian production. The Senator questioned the authority of FEA to sell the tools under the circumstances.

Reading from the report the Senator said the price was arrived at by a formula suggested by Sir Percy Mills, United Kingdom Comptroller General of Machine Tools, in a memorandum dated Oct. 4, 1944.

The memo said:

"Since 31,666 tools were delivered by the end of 1942, 20,144 during 1943 and 6195 during 1944, all used on war production during the German war and one-half being necessary for the Japanese war, it was assumed that the lend-lease use would not be less than three years.

"Some tools were lost in transit, some destroyed by the enemy, some in bad condition and some would not be needed for all of which an allowance of 25 pct of the original value of $166,000,000 was made, reducing the value to $124,500,0000.

"The tools were then divided into four classes:

"1. $18,000,000 worth of these tools were suitable for civilian work, to which the formula of the War Surplus Property Administration, valuing such tools at 50 pct of original cost is applied, resulting in a sales price of $9,000,0000.

"2. $45,000,000 worth of machines, having British equivalents, also suitable for civilian production, reduced first to the price level of British equivalents (estimated to be 50 pct) and then further reduced by the War Surplus Property Administration pricing formula by another 50 pct, resulting in a sales price of $11,250,000.

"3. $2,500,000 worth of armament manufacturing machines, suitable only for military production, desired solely as a reserve for defense, valued at 10 pct of original cost, resulting in a sales price of $250,000.

"4. $59,000,000 worth of miscellaneous tools, having British equivalents, at price ranges of 50 pct of the American price levels, valued at 37½ pct of that figure, resulting in a sales price of $11,000,000."

Senator Ferguson expressed the opinion that the machine tools were surplus property and that their disposition came under the terms of the Surplus Property Act. FEA declared that it had authority to sell the tools.

Disposal agencies, the report said, are confronted with a number of serious problems. Among those named were the scarcity of dollars in foreign countries and peculiar currency problems in the "Sterling Area"; artificially high rates of exchange; problems connected with customs duties and taxes which may be imposed on surplus transactions; establishing an order of preference or priority for purchasers of surplus.

The committee, commenting on the sale of machine tools to Geat Britain, said that FEA has created an additional channel for disposition of surplus property besides the "already multitudinous and complicated channels." The report declared that it is undesirable that property be disposed of, except through one agency clearly designed for that purpose and in command of all of the policy considerations. It is equally undesirable, it was pointed out, that any agency inject itself into this field without explicit authority.

The committee presented an FEA statement showing that from March 1941 through March 1945 a total of $675,017,000 worth of machine tools were furnished under lend-lease to 61 countries. Nearly $400,000,000 or a little less than two-thirds of the total was furnished to Russia and nearly $200,000,000 or a little less than one-third, was furnished to the United Kingdom, the bulk of the remainder being furnished to units of the British empire, principally Australia, $36,000,000 and India, $22,000,000. Proposed lend-lease of machine tools amounting to $27,475,000 for the fiscal year 1946 was also shown. They are: Soviet Russia, $10,000,000; Australia, $1,225,000; China, $8,000,000; France, $5,000,000; Belgium, $1,750,000, and the Netherlands, $1,500,000.

The report also showed French, Belgian and Netherlands lend-lease agreements for vast quantities of materials to be supplied. French agreements total $2,575,000,000; Belgian agreements, $325,200,000 and Dutch agreements, $242,000,000. Included in the French agreements are: Locomotives, $200,000,000; railroad cars, $120,000,000; metal working machinery, $100,000,000; industrial equipment, $150,000,000; machinery for mines, arsenals, etc., $900,000,000; raw materials for war use and essential supply, including steel, metals and numerous other products, $840,000,000.

"Examination of the file of the British machine-tool transaction discloses that one of the moving considerations was the fact that the machine tools produced for war production would create huge surpluses of machine tools, which would be a drug upon the postwar market and would, of course, adversely affect the interests of the machine-tool industry," said the Senate committee report.

"However, capital goods, as distinct from consumable items and particularly machine tools, which are the means whereby industrial mass production is made possible, present peculiar problems of extremely high

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policy and far-reaching repercussions when transferred in substantial quantities to foreign countries. It would seem to be a reliable assumption that lend-lease recipients, particularly Great Britain and Russia, will be competitors of United States industry in the postwar trade of the world. Whether or not it is in the best interests of the United States to contribute to their industrialization and strengthen their ability to compete and absorb markets which otherwise might be served by American industry employing American labor requires a decision which ought not to be made in any casual fashion by administrative employees. Especially is this so when the price paid by the lend-lease country for the residual value of such tools may be far below what it will cost American industry to acquire similar tools."

Conclusions of the report follow:

Conclusion No. 1.—The supplying of our armed forced in Europe has been a remarkable achievement, involving the delivery across the ocean and over beaches and through demolished ports, and then over a war-torn countryside into France and Germany of tonnages far in excess of anything previously within the conception of man.

Conclusion No. 2.—This supply function could be improved by increasing the sensitivity of the mechanisms designed to reflect in the procurement system changes of requirements on the fighting fronts, without, however, any abdication by the procurement authorities of the exercise of their judgment in the light of overall procurement problems. One result of the lack of sensitivity was an accumulation in the European theater of 110,000 tons of two types of aerial bombs which were delivered to the theater, although the Air Corps in the theater testified that they had no use for one type and a very limited use for the other.

Conclusion No. 3.—The program for redeployment of materials to the Pacific theater is proceeding well, providing that plans now formulated are properly executed.

Conclusion No. 4.—The disposition of surpluses abroad requires further intensive study. As it is now proceeding, it is apt to result in the disposal of these surpluses without proper assurances that the highest return is being obtained or that the most important needs are being filled. Disposal of surpluses abroad should be entirely in the hands of a single agency which in turn should operate under the direct control of the Surplus Property Board. In this way policy at home and abroad will be coordinated. It will also eliminate the present situation in which American surplus property is disposed of by a multiplicity of agencies.

Conclusion No. 5.—American rights to fixed installations which we have erected abroad have not been clearly defined. It is essential that immediate and careful study be given to the future disposition of installations which we have erected abroad.

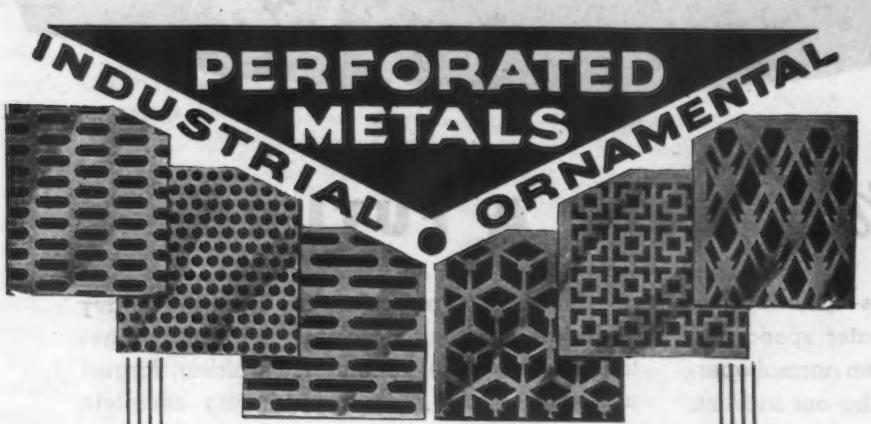
Conclusion No. 6.—Large quantities of captured goods and munitions have not yet been inventoried. There is as yet no plan or the disposal of this material, nor is there any coordination between our plans and those of our allies. This condition should be remedied immediately.

Conclusion No. 7.—As a result of the impending evacuation o our troops in France and their occupation of Germany, the Army has shown a disposition to have no further interest in the French economy while it finds it necessary to strengthen the German transportation and industrial system in order to assure itself of proper supply in Germany. While this is a natural attitude on the part of the armed forces, it must be counteracted if we are to avoid a situation where our enemies fare better at our hands than our friends.

Conclusion No. 8.—The division of Germany into four zones of occupation has resulted up to this time in vesting the control of what has been a closely integrated nation into four wholly incoordinated elements. With respect to at least one part of Germany, that held by the Russians, our armies were completely uninformed. It is absolutely necessary that the policies with respect to the four occupational zones be coordinated by some joint action and that there be a free exchange of information with respect to the policies and actions of each of the occupying forces.

Conclusion No. 9.—Itemized invoices of services and materials supplied under reverse lend-lease have not been furnished. Consequently, no reliable accounts of lend-lease and reverse lend-lease transactions are available. Some progress has been

(CONTINUED ON PAGE 143)



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Photograph shows the loading of one of Copperweld's forty-three annealing furnaces with ARISTOLOY electric furnace steel billets. Our annealing and heat treating operations include spheroidize annealing, solution and under-critical annealing, isothermal annealing and oil and water quenching.

All furnaces are car type and all are equipped with automatic temperature control with a range up to 2000° F.

The Copperweld mill is comprised of the most modern and efficient equipment known to industry and our production is confined to high grade electric furnace alloy steel blooms, billets and bars. It is the most completely integrated mill of its type and was designed and built by practical experienced steel makers to most efficiently produce "TOP QUALITY" electric furnace steels.

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ARISTOLOY STEEL INTERNATIONAL COMPANY • EXPORT DIVISION • WASHINGTON, D. C.

ARISTOLOY STEELS

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With "BALANCED WET BULB" TEMPERATURE CONTROL

U. S. Patent Re-issue No. 22,533

● This new method offers the advantage of lower cost thru the saving of 95% of cooling water. It avoids the risk of shut-downs from interrupted water supply. It provides a closed circuit saving the expense of water treatment. It saves the installation cost of water pumps, piping and extra equipment.

In addition, it offers precise temperature control, both during cooling operation and in bringing cooled liquids back to desired temperatures after shut-downs. This is accomplished with the Niagara "Balanced Wet Bulb" temperature control which always provides the correct admixture of fresh outdoor air with recirculated air. Full capacity is always maintained.

Successfully applied to a wide variety of industrial liquids, the NIAGARA Aero HEAT EXCHANGER has a three-year record of trouble-free operation in many important plants.

Write for Bulletin 96

NIAGARA BLOWER COMPANY

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NEWS OF INDUSTRY

Contract Terminations Reach $5 Billion, Lead By Air Force and ASF

Washington

• • • Reflecting VE-Day cutbacks, commitments canceled by contract terminations shot up to $5.1 billion from $1.8 billion in April, Director of Contract Settlement Robert H. Hinckley has reported. At the same time, he said that the May settlement rate was increased to $1.7 billion as compared with $800 million a month during the third quarter of last year. He added that the rate of settlement will rise further between now and September. In August and September, Mr. Hinckley said, settlements should be above a $2 billion monthly rate since by that time claims will have been filed or waived and settlement reached on a considerable portion of the terminations made in April and May.

The War Dept. accounted for the major part of May cancellations, as in April, Mr. Hinckley said, with a total of $4 billion of terminations. Of these, the Air Force canceled commitments of more than $2.7 billion, while Army Service Forces cancellations totaled $1.9 billion.

"The situation on cost-plus-fixed-fee contracts is better," said Mr. Hinckley. "According to figures covering settlements on these contracts to the end of March, a large part of the pending load of cost-plus terminations had been settled so far as their termination aspects were concerned. Cost-plus contracts, when terminated, take longer to settle finally because it is extremely difficult to separate payments connected with the unterminated portion of the contract, requiring minute cost inspection, from those strictly associated with the termination. The estimate that a large part of the load pending a the end of March was substantially settled is based on the fact that 99 pct of the number of subcontractors' claims for cost-plus contract terminations pending over six months were settled and amounts owing prime contractors were nominal.

"Applications for partial payments for prime and subcontractors continue to be disposed of in satisfactory time. In almost all instances, partial payment applications are acted on within 30 days of receipt of the request. Only one War Dept. application has been pending over 30 days. The Navy Dept. also has only one case pending over 30 days."

NORTH AMERICAN AVIATION, INC., big name in the industry, changed to Shell Industrial Lubricants and solved a serious rusting problem in 30,000 pieces of producing equipment—without loss of production time!

OIL CHANGE *on the Fly*

At North American Aviation, Inc., RUST was "termiteing" 30,000 pieces of producing equipment vital in turning out P-51 Mustangs and other equally important planes.

Urgently needed: a corrective—to work on the fly! Every second on North American's production line is precious—balance of power in some faraway battle-sky may depend on it.

Shell Lubrication Engineers—called in to work with North American technicians—recommended use of Shell's Turbo Cleaner.

The suitable viscosity of this cleaner permits its use as the lubricating oil in hydraulic systems of machine tools and other equipment during a cleaning operation. With this double-feature oil, North American lost *not a single minute* of valuable production time.

Cleaning completed, three grades of high-quality Shell Tellus Oils were then used. These oils possess rarely found rust-preventive qualities. Unusual "wettability" prods them into penetrating rusted surfaces—loosening and dislodging particles of scale.

Shell Engineers also recommended coating machine areas above the oil level with Shell Ensis Oil. This protects metal from moisture in the air . . .

Result of these changes: complete elimination of this rust problem at the North American plant . . . tens of thousands of dollars saved . . . *more* fighting-mad Mustangs in the air.

Are you sure the machines in your plant are getting the benefit of all that's new in lubrication as it develops? Contact Shell Oil Co., Incorporated, 50 W. 50th St., New York 20, N. Y., or 100 Bush St., San Francisco 6, Cal.

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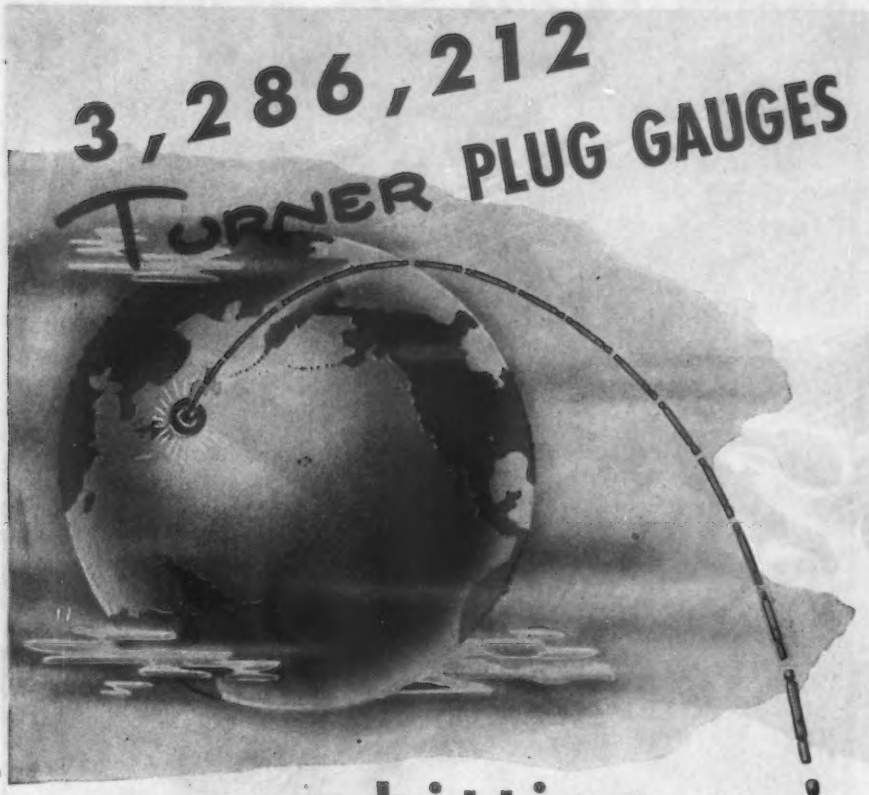

. . . are hitting the target!

We don't know how many plug gauges laid end to end it would require to reach Tokyo, but we do know that we made 3,286,212 steel and chrome plug gauges to check many types of war implements that do reach our military objectives.

Yes, *precision* has become the watchword of industry during this war, and it will continue to be a factor in those industries that will be the leaders in peacetime production.

★ Remember the name Turner when you think of Precision.

TURNER BROTHERS

TURNER GAUGE GRINDING COMPANY
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Types of Gauges we make

Cylindrical Plug Gauges, Plast-O-Lock Plug Gauges, Cylindrical Ring Gauges, Special Flush Pin Gauges, Solid Type Snap Gauges, Master Discs, Built Up Gauges

Says New Business Has Offset Contract Terminations at GE

New York

• • • **Termination of war** contracts held by the General Electric Co., while proceeding at a substantial rate, has left few gaps in the company's over-all business because of the large volume of new orders that has been received, according to Charles E. Wilson, president of the company. At the same time, little relief in a tight labor situation has been afforded.

In 1944, GE war contracts, held either as a prime contractor or as a subcontractor, were terminated by cancellations or cutbacks at an average rate of $32,000,000 a month. In the first five months of 1945 the monthly average of terminations has been only $23,000,000, with March and May up to last year's average and the other three months substantially below it.

Mr. Wilson pointed out that orders received in 1944, largely for war products, totaled $1,609,636,000, and that orders for the first five months of 1945 total $598,481,000. In each period, the new orders have exceeded the billing for the period, and thus for the company as a whole have filled the gaps left by cancellations and cutbacks. In some departments the volume of unfilled orders has been substantially reduced by the shipment of completed war goods, combined with the termination of incomplete orders.

During the past 12 months there have been several large terminations, Mr. Wilson said, and most of the employees who have been working on these and other terminated contracts were offered jobs on continuing contracts, so that only a relatively small number were actually laid off for lack of work.

Most of the shrinkage of employment since the peak on Dec. 31, 1943, when 175,290 were employed on GE war work has not been caused by terminations of contracts resulting in layoffs. The employment figure for March 31 of this year was 153,685.

Mr. Wilson pointed out that the effect of cancellations and cutbacks to date has not been to relieve critical labor shortages at General Electric, particularly with regard to the more highly trained engineers, technicians, designers and skilled workmen such as toolmakers and all-around mechanics. Common labor also is still almost impossible to obtain. New contracts in many communities have

WHEN RUST-PROTECTING STORED WAR MACHINERY...

CALL THE HOUGHTON MAN

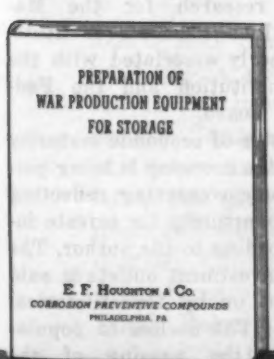
Houghton is ready to help you process plant equipment

Government inspectors who have been instructed on proper preparation of war machines for storage and shipment will check all equipment closely to assure freedom from danger of metal corrosion.

However, the job of processing those war machines is primarily yours—a job that must be done before you can reconvert to peace-time work.

The Houghton Man can help you in this problem. He has been trained during past months on the most efficient methods and procedure. And he has available for you a complete line of rust preventives which meet and *exceed* government specifications, including AXS-673, 674, 934, 1015, USA 2-82, 2-121, and others required in this program.

Backing him with technical advice is a Research Staff with a backlog of 80 years of experience and complete testing facilities. You are invited to use this service . . . to ask for helpful booklets on the corrosion problem . . . and to ask for quotations on preventive compounds required. Write or call E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia, or Chicago, Detroit, San Francisco.



AVAILABLE NOW . . . *this complete guide to preparation of war machines for storage, digesting the processing outlined by government agencies. Write for free copy.*

Houghton's

RUST PREVENTION SERVICE

created demands for labor that is not available from cutbacks and cancellations of contracts for products no longer needed in such great quantities. Typical is the situation at Syracuse, where General Electric's second largest war plant is located, and where new contracts have been placed for products that require more labor than those that were canceled.

Even cancellations received by other employers in the community have failed to provide an adequate supply of properly qualified help. Much labor that is released as a result of cancellations leaves the labor market and returns to the home or to prewar pursuits, GE surveys disclose. Many released workers are unwilling to work night shifts. Yet this is absolutely essential, because there are not enough manufacturing facilities to meet the requirements of the Armed Forces on one shift.

Machinery Institute Analyzes the Bogey Of Economic Maturity

Washington

• • • The Machinery & Allied Products Institute has published *The Bogey of Economic Maturity*, said to be a complete analysis of the theory of economic maturity which rejects both the theory and the pessimistic forecasts to which it has given rise.

The author of *The Bogey of Economic Maturity*, George Terborgh, is director of research for the Machinery & Allied Products Institute. He was formerly associated with the Brookings Institution and the Federal Reserve Board.

The advocates of economic maturity contend that the economy is being poisoned by chronic oversaving, reflecting inadequate opportunity for private investment according to the author. The shortage of investment outlets is said to be brought on by four historical developments: The decline of population growth; the passing of the frontier; the dearth of great new industries; and the increasing importance of depreciation reserves. These developments, characterized by the Institute's study as "the four horsemen of the new apocalypse," are analyzed at length and dismissed as substantially harmless.

Since there is no reason to expect chronic oversaving and economic debility because of these factors, there is no warrant for anticipating a need for continuous government deficits as an economic stimulus it was argued.

CUT 8-GAUGE STEEL
with No. 208
STANLEY UNISHEAR

Steel and brass mills, shipyards, heavy sheet fabricating shops, tank shops, railroad shops and others use Stanley No. 208 Unishears on the heavy production jobs as well as in their maintenance and repair divisions.

A one-man portable electric shear that cuts up to 10 feet per minute – makes straight or curved cuts. Easily suspended when job requires it. Maximum capacity 8 gauge (.171" thick) hot rolled steel. Write for complete details. Stanley Electric Tools, Division of The Stanley Work, New Britain, Connecticut.

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•Harmless momentary overloads pass without breaking the circuit, due to a time-lag feature built into every Square D Circuit Breaker.

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•Fuses are eliminated—no replacement of parts is necessary.

•Electrical equipment has constant proper protection, because every Square D circuit breaker is factory-sealed and consequently tamper-proof.

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You'll find that Square D understands your special problem, and builds exactly the circuit breaker you need. Let your nearby Square D Field Engineer show you how a modern circuit breaker installation can give you smoother plant operation at lower cost. Or . . . write for Industrial Circuit Breaker Bulletin. Address Square D Company, 6060 Rivard Street, Detroit 11, Mich.

See our Catalog in Sweet's
. . . or write for Bulletin . . .

SQUARE D's Circuit Breaker Line is Complete!

Square D has the *right* unit for any installation. You may select from a wide variety of enclosures, including general-purpose, rain-tight, dust-resisting, and explosion-resisting. Capacities range from 15 to 600 amperes, up to 600 volts.

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PAGE for WIRE

...AND THE RIGHT ANSWERS TO WIRE QUESTIONS

● If the question has to do with wire or the use of wire in production, **PAGE** can serve you. Wire and its application have always been the business of **PAGE**.

WHAT SIZE WIRE?

What size will do the job best and most economically? **PAGE** can give you the answer—and supply the wire.

WHAT SHAPE SECTION?

PAGE makes wire in many standard shapes. If you need a special shape, **PAGE** can make it for you—in end-section areas to .250" square—widths to ⅜". You draw the shape—**PAGE** can draw the wire.

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PAGE is regularly drawing wire of high and low carbon steel, Armco ingot iron, stainless steel, special alloys. Heat-treating and finishes to required specifications.

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PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

S.A. Engineers to Get Training in U. S. Highway Construction

Washington

• • • Twenty practicing Latin American engineers and construction men are to receive a year's special training in the United States beginning in 1946, according to a plan announced by Charles M. Upham, engineer-director of the American Road Builders' Assn. Training will consist of study and practical experience with the objective of familiarizing the trainees with American construction methods, equipment, materials and specifications, he explained.

For more than 15 years, the American Road Builders' Assn. through its Pan American Div., of which Jose Rivera of Mexico is secretary, has sponsored scholarships for the training of Latin American highway engineers in this country, Mr. Upham said. This training consisted of placing these engineers with state highway departments, manufacturing plants, contractors, colleges and the federal government, according to the aptitude and future plans of the individual. Today, without exception, these men are holding responsible positions in their own countries.

Now in conjunction with the Office of Inter-American Affairs, the U. S. Dept. of State, the Public Roads Administration, Pan-American Highway Confederation and other agencies, the American Road Builders' Assn. plans to expand and extend this training to include 20 students a year, and to accept engineers, construction superintendents, plant managers or master mechanics who can meet the requirements of education and experience.

Engineers must be graduates of a recognized school of engineering, have four years of practical experience, and be between 24 and 40 years of age. Others must have the equivalent of a high school education, eight years' experience and be between 28 and 40.

Each trainee on arrival in Washington will receive a special orientation course consisting of lectures and field trips during which time he will receive subsistence expenses from a fund set up by the American Road Builders' Assn. and the Office of Inter-American Affairs. This will be supplemented by eight months' practical field work in highway departments or manufacturing plants, or both. Trainees will receive living ex-

Adaptability

Michigan Welded Steel Tubing

SIZES: ¼" to 4" O.D.
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Available in commercial mill lengths or cut to specified lengths, shaped and fabricated ready for assembly.

Michigan welded steel tube can be flanged, expanded, cold drawn, fluted, flattened, bent, coiled, upset, beaded, grooved, rolled, spun, threaded, tapered, and shaped to meet every manufacturing demand.

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WHY IMPACT MACHINERY REQUIRES KORFUND VIBRATION CONTROL

Resiliently mounting impact machines, such as drop hammers, punch presses, and shears on Korfund Vibro Isolators produces these four distinct benefits:

1. More efficient production line by permitting precision equipment to be located near impact machinery.
2. Improved employee efficiency and reduced absenteeism by controlling fatigue-producing vibration.
3. Prolonged machine life by preventing shock to machine parts.
4. Reduced building maintenance by blocking the transmission of vibratory forces to the building structure.

Korfund engineers, with more than forty years of experience in vibration control, are ready to help you solve your vibration problems. Write today for further information.

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48-35 Thirty-second Place Long Island City 1, N. Y.
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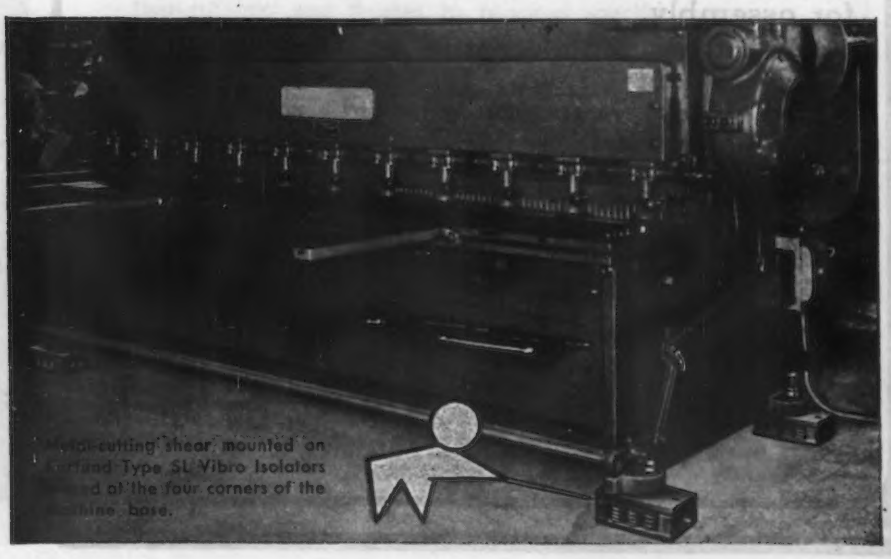
KORFUND VIBRATION CONTROL



Metal-cutting shear mounted on Korfund Type SL Vibro Isolators placed at the four corners of the machine base.

penses from their employers in lieu of wages.

Each candidate chosen will be expected to defray his own traveling expenses from his home to Washington, and also his personal expenses such as passport visas while traveling to and from the United States. Each applicant is required to have $250 in American funds for contingencies. He must possess a working knowledge of the English language.

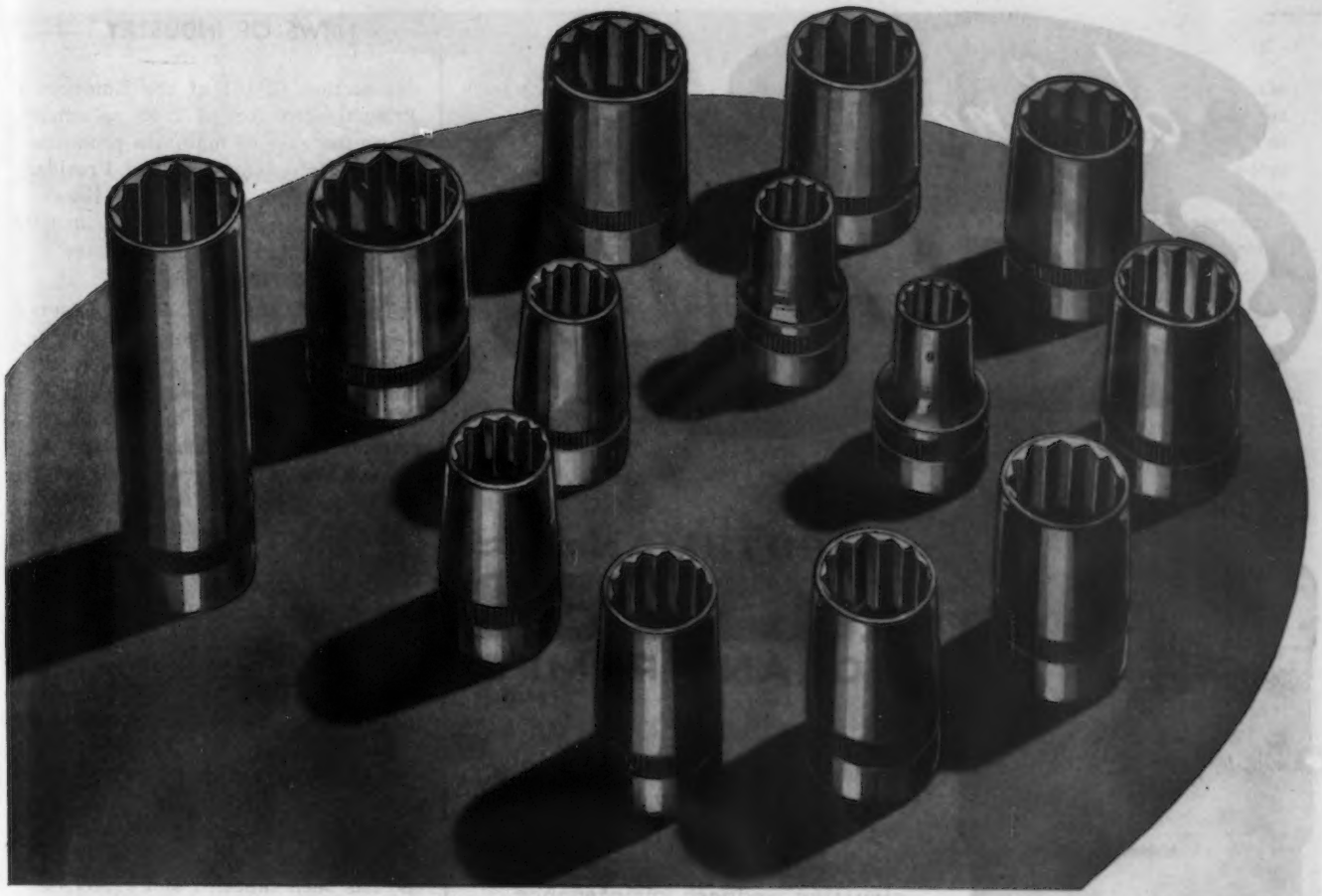
Five RFC Subsidiaries Have Been Merged To Simplify Operations

Washington

• • • Absorption by RFC of its five subsidiaries through a Joint Resolution recently passed by Congress in addition to simplifying operation may reasonably be expected to result in some economy, according to Federal Loan Administrator John W. Snyder. The subsidiaries merged into RFC are the Defense Plant Corp., Metals Reserve Co., Defense Supplies Corp., Rubber Reserve Co., and Disaster Loan Corp., all except DLC created for purposes of national defense and war production.

The management of their activities will remain in the Board of Directors of the RFC, members of which previously served as directors of the subsidiaries. All outstanding contracts of the subsidiaries, and all new contracts which may be necessary, Mr. Snyder said, will be administered by substantially the same personnel as in the past, although this personnel henceforth will be acting directly for RFC instead of acting for the subsidiaries. Thus, he pointed out, there will be no interference in the flow of strategic materials and other critical supplies and equipment essential to the successful prosecution of the war against Japan.

"Authorizations as of January this year by these subsidiary corporations, together with RFC direct commitments for war purposes of approximately $2,600,000,000, have amounted in round numbers to $32,300,000,000," the Federal Loan Administrator said. "Disbursements have been in excess of $18,000,000,000. Repayments of loans and advances, collection of rentals and part payments on plants and equipment, and proceeds of sales of materials, etc., have been approximately $9,100,000,000. The disbursement figure includes $1,400,000,000 for direct subsidy payments, un-



WRENCH SOCKETS MADE FROM STEEL that is STRONG but not "STUBBORN"

• Machining wrench sockets was a tough production problem. That was before Sulfite-Treated Alloy Steel was used. Now, machining operations are much faster and easier with far fewer rejections of the finished product.

With no sacrifice of strength, Sulfite-Treatment removes the "stubbornness" from steel, giving it "magic machinability." Labor and material costs are slashed, tool life is tremendously extended and production increases.

Sulfite-Treated Steel is metallurgy's latest answer to machining problems. Developed by our metallurgists, it is one more example of Wisconsin Steel's leadership in the manufacture of high-grade alloy and special steels.

Whatever your machining problems, you owe it to yourself to investigate the special qualities of Sulfite-Treated Steel. Our sales and metallurgical staffs are at your service. They will be glad to show you how Sulfite-Treated Steel may be applied to your product.

WISCONSIN STEEL COMPANY

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WISCONSIN SULFITE-TREATED **STEEL**

designed to
SAVE MONEY

RUTHMAN
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COOLANT PUMPS

You save money three ways when you specify Ruthman Gusher Coolant Pumps on your machines. Sturdy, simple construction reduces maintenance costs . . . there are fewer parts to wear or get out of order. Steady, uninterrupted flow of coolant allows you high-precision production on your machined parts . . . Ruthman pumps deliver a mere trickle or a copious flow of coolant. Long, trouble-free life minimizes replacement costs . . . Ruthman pumps give satisfactory service year after year with very little attention.

There's a Gusher
For Every
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THE RUTHMAN MACHINERY CO.
1821 READING ROAD CINCINNATI 2, OHIO
THE "GUSHER"
A MODERN PUMP FOR MODERN MACHINE TOOLS

der section (2)(e) of the Emergency Price Control Act of 1942, as amended, to increase or maintain production of materials defined by the President to be strategic or critical. However, this latter figure does not include losses arising from the purchase and sale of such materials."

The RFC, through Metals Reserve Co., has made total commitments for the purchase of strategic and critical minerals and metals aggregating $5,174,000,000. Of this amount $2,150,000,000 has been disbursed and $2,149,000,000 canceled or assigned to industry or the FEA. Sales of these materials have been principally to industries engaged in war production and have amounted to $1,313,000,000.

Stockpiles on hand cost $538,600,000, and, in addition, the company has assets largely in the nature of advances to contractors, other receivables, and mining equipment and supplies in the amount of $67,800,000.

The RFC, through DPC, has made commitments for war plants, facilities and machine tools aggregating $10,704,935,000. Of this total $757,656,000 has been canceled and $7,177,700,000 disbursed.

The total figure includes poor order commitments for machine tools aggregating $1,985,000,000. These orders are issued to insure the machine tool manufacturer a market for his product, and, as the tools are sold by the manufacturer, RFC's obligation ceases.

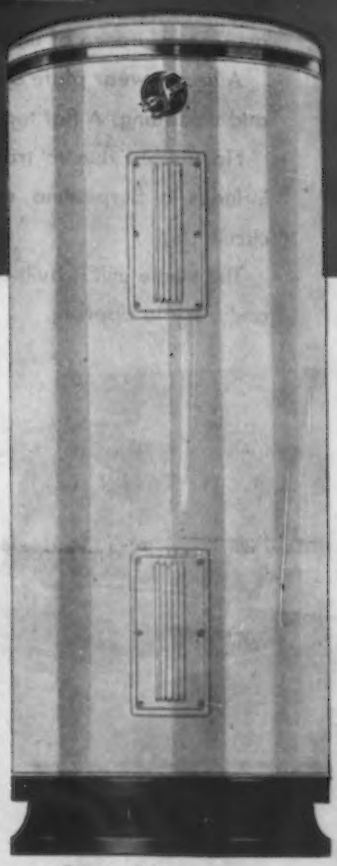
The corporation has only been required to buy tools under these orders aggregating $4,912,000, and its outstanding commitments at this time are only $33,271,000. In addition to the pool orders, machine tools have been supplied to 1007 contractors in the amount of $1,087,000,000 the contractors paying a fixed rental.

Total commitments include 920 complete, integrated plants, wholly owned by DPC, in the amount of $6,055,000,000; and the expansion of 122 existing privately owned plants in the amount of $740,000,000. These expansions are wholly owned by RFC and are located on land owned by it or held under long term lease. Commitments for facilities to produce critical and strategic materials in foreign countries have aggregated $42,714,850.

The RFC, through Defense Supplies Corp., had authorized total expenditures in the war effort aggregating $10,350,000,000, of which $80,000,000 has been canceled or assumed by private industry.

SMITHway Electrodes in action—Mass-production welding of both ends of SMITHway *Permaglas* Automatic Storage Water Heaters completes one tank each 1½ minutes.

Production LINES BECOME Profit LINES WITH SMITHWAY WELDING ELECTRODES



WELDING a glass-lined head to a glass-lined shell is quite a trick in itself. But with automatic welding heads and SMITHway electrodes, the setup shown above welds at the rate of 80,000 water heater tanks per year.

Day in and day out, mass production line jobs are taken in stride through the use of SMITHway electrodes. More and more manufacturers are including welding as a better method of fabricating most steel products.

Write for SMITHway Welding Electrode Catalog, and make the most of Welding as a production tool in your own operations.

Buy an Extra War Bond This Month!

Mild Steel . . . High Tensile . . . and Stainless Steel

WELDING ELECTRODES

made by welders . . . for welders

SMITHway Welding Monitor trains better welders, faster.

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IF YOU WANT SUB-ZERO TEMPERATURES

Check These Points...

This Kold-Hold electrical refrigeration cabinet will hold down to MINUS 150 DEGREES consistently.

Its load chamber is only 14" from top to bottom—hence a minimum temperature gradient between those points. This assures uniformity of cold treatment throughout the load and avoids thermal shock in work parts—no checking or fractures.

In addition, the load chamber is long enough (either 25" or 55") so that work parts may be laid flat instead of being processed vertically—another assurance of uniformity.

A heavy wear plate on top materially assists the operator in loading and unloading. A flat top gives him convenient working room.

No trouble due to trapped oil in the evaporator because this unit includes a Serpentine evaporator, the only one that cannot short-circuit.

The whole unit is built especially for industrial service—sturdy, simple and easy to operate.

Write for Bulletin SZ 443.

KOLD-HOLD MANUFACTURING CO.
438 N. Grand Avenue
Lansing 4, Michigan

KOLD-HOLD

RFC Now Operating Nationwide Outlets To Handle Surpluses

Washington

• • • The Reconstruction Finance Corp. recently announced that it now has 41 surplus property sales outlets in operation in 41 cities throughout the United States, and has authorized the immediate opening of 7 more outlets.

The establishment of this nationwide chain of outlets is in keeping with RFC's objective, announced early this year, of making it easy to acquire RFC-handled surpluses, and advanced RFC's "grass roots" distribution program through three principal actions:

1. RFC has now designated all of its regional agencies as RFC Disposing Agencies. This increases the number of Disposing Agencies from 23 to 31, located strategically throughout the country. They are interconnected by rapid teletype communication which makes it possible for any buyer in any part of the country to put in an order for RFC surpluses located in any other part of the country, with the assurance of quick action.

2. RFC has also opened 10 branch sales offices. At least 50 branch sales offices are expected to be in operation before autumn. These branch offices will have surplus property display rooms. Information may be obtained by interested buyers at any of them about surplus aircraft, industrial plants, and producers' and capital goods, comprising some 3000 principal items for which the Surplus Property Board has named RFC as the disposal agency.

3. Twelve additional aircraft sales centers have been acquired, bringing the number of aircraft sales centers to 66. These handle surplus aircraft exclusively.

The following are the 31 RFC Disposing Agencies and the territory each serves:

Atlanta region: (Healey Bldg., Atlanta 3.) All of Georgia.

Birmingham region: (Comer Bldg., Birmingham 3.) All of Alabama.

Boston region: (10 Post Office Square, Boston 9.) All of Massachusetts, Maine, New Hampshire, Vermont, Rhode Island, and Connecticut (except Fairfield County).

Charlotte region: (Wilson Bldg., 109 West 3 St., Charlotte 1, N. C.)

if you're

moving materials 200 feet or more...

HANDLE Mercury "Yank" fork truck loading sheet steel on waiting trailers.

DO IT QUICKER, CHEAPER WITH THE...

FORK TRUCK "TRACKLESS TRAIN" SYSTEM

Industry can well profit from close study of the improvements in materials handling technique developed by the supply divisions of our armed forces. Of particular interest is the wide use of the Fork Truck—"Trackless Train" System for handling materials when distances exceed 200 ft.

In the system the fork truck (a handling and stacking machine) is used for loading trailers. Loaded trailers are made up into trains and hauled away by a tractor. "The Trackless Train" has no fixed path and may travel anywhere that necessity dictates. At destination, the fork truck removes and stacks the pallet loads to ceiling heights.

A few of the many advantages of the system are:

(1) Equipment works continuously—"dead heading" reduced to the minimum.

(2) Handles larger loads—one trailer train is equivalent to 5 to 10 truck loads.

(3) Less manpower required.

(4) Lower investment in equipment for handling comparable volume.

(5) Lower power consumption in transporting; only the tractor consumes power.

These handling advantages are also available to you. For the complete story ask to have a Mercury Engineer call—or write for Bulletin 7-11.

HAUL A train of loaded trailers is coupled to the Mercury "Banty" gas tractor and hauled to destination. The "Trackless Train" has no fixed path and may travel anywhere necessity dictates.

STACK At destination the tractor is uncoupled and sent on its way. The "Yank" removes the loads from the trailers and stacks them to ceiling heights.

THE MERCURY MANUFACTURING COMPANY
4144 South Halsted Street · Chicago 9, Illinois

MERCURY

TRACTORS · TRAILERS · LIFT TRUCKS

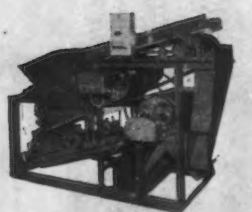
one of these DINGS MAGNETIC SEPARATORS

Dings Magnetic Drums
Cylindrical shell revolves around stationary magnet. Separation is automatic.

. . . will handle your job!

No matter how unusual or difficult a separating job you may have, there is a Dings High Intensity Separator that will handle it—with more positive results and less cost to you! This is made possible by the nearly 50 years Dings has spent developing magnetic equipment for the metal working industry. Write today for bulletins.

The Dings High Intensity Magnetic Pulley utilizes air-cooled construction and *bronze* spacer rings to provide complete, automatic separation. For use as head pulley in a belt conveyor system.



The Dings DA Magnetic Separator for separating ferrous and non-ferrous scrap. Two High Intensity Pulleys assure doubly clean separation. Feeder is reciprocating. Rubber covered idler adjusts gap between upper pulley and main conveyor belt.

Dings High Intensity Lifting Magnets feature a balance of copper wire and steel which is correctly proportioned to assure maximum lifting capacity with a minimum of weight and current input.

Dings High Intensity Type BN Separator. For separating mechanically entangled scrap. Combines magnets of alternate polarity with mechanical agitation to accomplish amazing results.

Dings High Intensity Type L Spout Magnets are designed for installation in chutes. Automatic gate discharges accumulated iron when current is interrupted.

DINGS MAGNETIC SEPARATOR COMPANY
516 E. Smith St.,
Milwaukee 7, Wisconsin

"Separator Headquarters"
Since 1899

Dings MAGNETIC SEPARATION HIGH INTENSITY

All of North Carolina and South Carolina.

Chicago region: (208 S. LaSalle St., Chicago 4.) 58 counties of Illinois; 68 counties in Indiana; all counties of Wisconsin, except those west of Monroe, Jackson and Clark Counties and north of Clark, Marathon, Langlade, Aconto and Marinette Counties; and all of Iowa.

Cleveland region: (Federal Reserve Bank Bldg., Cleveland 1.) All of Ohio; all counties in Kentucky east of Gallatin, Owen, Franklin, Anderson, Mercer, Boyle, Casey, Russell and Wayne Counties; all counties of Pennsylvania west of McKean, Elk, Clearfield, Cambria and Bedford Counties; and Brooke, Hancock, Marshall, Ohio, Tyler and Wetzel Counties in northern West Virginia.

Dallas region: (Cotton Exchange Bldg., Dallas 1.) 159 counties of Texas; Atoka, Bryan, Choctaw, Coal, Johnson, McCurtain, Marshall and Pushmataha Counties in southeastern Oklahoma; 18 counties in New Mexico; and Cochise, Graham, Greenlee, Pima, and Santa Cruz Counties in southeastern Arizona.

Denver region: (Boston Bldg., Denver 2.) All of Colorado and the 13 counties of New Mexico.

Detroit region: (607 Shelby St., Detroit 26.) All of Michigan, except the Upper Peninsula.

Helena region: (Power Block, Helena, Mont.) All of Montana.

Houston region: (Rusk Bldg., 723 Main St., Houston 2, Texas.) 43 counties in southeastern Texas.

Jacksonville region: (Western Bldg., Jacksonville 2, Fla.) All of Florida.

Kansas City region: (Federal Reserve Bank Bldg., Kansas City 6, Mo.) All of Kansas; and the following counties in Missouri: Andrew, Atchison, Barton, Bates, Buchanan, Cass, Clay, Clinton, De Kalb, Gentry, Holt, Jackson, Jasper, McDonald, Newton, Nodaway, Platte, Vernon and Worth.

Little Rock region: (Pyramid Bldg., Little Rock, Ark.) All of Arkansas.

Los Angeles region: (Pacific Mutual Bldg., Los Angeles 14.) Imperial, Inyo, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara and Ventura Counties in southern California; and all of Arizona except Cochise, Graham, Greenlee, Pima, and Santa Cruz counties in southeastern part of state.

Louisville region: (Lincoln Bank

It started with the other hand

Right or left-handed, your *other* hand is a type of jig.

A jig is something to hold work while you're working on it.

Notches in stones or logs left both hands free.

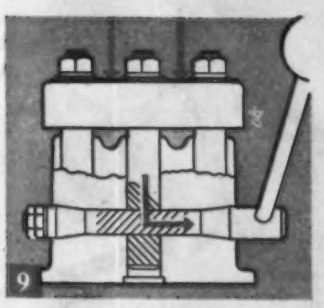
Two heavy stones once served as a sort of vise or jig.

Modern adjustable jigs have two faults. Some slip, hurt people.

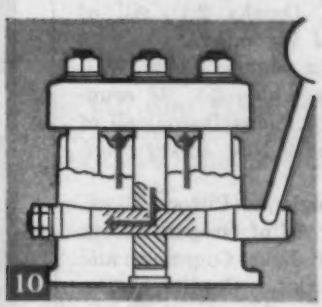
Locking mechanisms of others wear out fast or fail.

These problems were solved by Woodworth's CONE-LOK JIG.

This amazing jig locks instantly. Can't slip. Protects workers.



Force on top travels thru 45° gear to right. Left cone locks.



Force from below is transmitted to left . . . locks cone at right.

CONE-LOK JIG is simple. Three moving parts do the job.

CONE-LOK is praised by production men everywhere.

What Woodworth products mean to industry

THE contribution to mass production efficiency made by the CONE-LOK JIG is typical of all Woodworth products.

There is a reason for this.

Every Woodworth product must conform to the basic policy of this company . . . *to make only products which will benefit industry through increased production and reduced costs.*

This means that the great demand for Woodworth Tools and Gages will be continuing, especially in view of the coming battle for postwar markets.

And it means that Woodworth engineers have been charged with the responsibility of searching constantly for new ways to speed up and lower the cost of production, in connection with Woodworth products of the future.

The constant growth and expansion of the N. A. Woodworth Company is due to strict adherence to these objectives.

ACCURACY YOU W CAN TRUST

WOODWORTH

N. A. WOODWORTH CO., SALES DIVISION, 1300 E. NINE MILE ROAD, DETROIT 20, MICHIGAN

PRECISION GAGES

PRECISION MACHINED PARTS

PRECISION TOOLS

To: Hack saw users
A WORD
OF ADVICE

Buy STAR Blades
FOR faster cutting
FOR cleaner surface
AND they last longer
HERE'S WHY

FREE — STAR Metal Cutting handbook gives valuable instructions on selection, use, and care of hack saw blades.

1. Keen, sharp teeth; hardened to cut fast and deep.
2. Accurate set provides ample clearance.
STAR
3. Finest grade of high-speed steel, scientifically heat-treated, gives STAR blades longer life.
4. Each blade clearly marked to make identification easy.

TRADE MARK
7574
CLEMSON
CLEMSON BROS., Inc. Middletown, N.Y.

NEWS OF INDUSTRY

Bldg., 421 W. Market St., Louisville 2, Ky.) 64 counties in Kentucky; and Clark, Crawford, Floyd, Harrison, Jackson, Jefferson, Lawrence, Orange, Perry, Scott, Switzerland and Washington Counties in southern Indiana.

Minneapolis region: (McKnight Bldg., Minneapolis 1.) All of Minnesota, North Dakota, South Dakota, the Upper Peninsula of Michigan, and 26 counties in northern Wisconsin.

Nashville region: (Nashville Trust Co. Bldg., Union St., Nashville 3, Tenn.) All of Tennessee.

New Orleans region: (Richards Bldg., 837 Gravier St., New Orleans 12.) All of Louisiana and Mississippi.

New York region: (70 Pine St., New York 5, N. Y.) All of New York State; Fairfield County in Connecticut; and 12 counties in New Jersey.

Oklahoma City region: (Cotton Exchange Bldg., Oklahoma City 2.) All of Oklahoma except Atoka, Bryan, Choctaw, Coal, Johnston, McCurtain, Marshall and Pushmataha Counties in southeartern part.

Omaha region: (Woodmen of the World Bldg., Omaha 2.) All of Nebraska and Wyoming.

Philadelphia region: (1528 Walnut St., Philadelphia 2.) 48 counties in eastern Pennsylvania; all of Delaware; and 9 New Jersey counties.

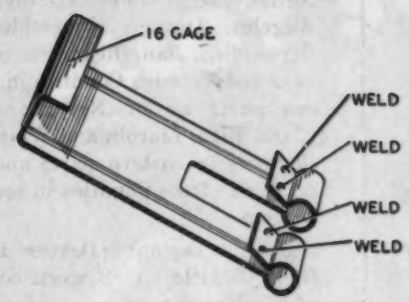
Portland region: (Pittock Block, Portland 5.) All of Oregon, except Klamath and Lake Counties; and Skamania, Klickitat, Cowlitz, Clarke and Wahkiakum Counties in Washington.

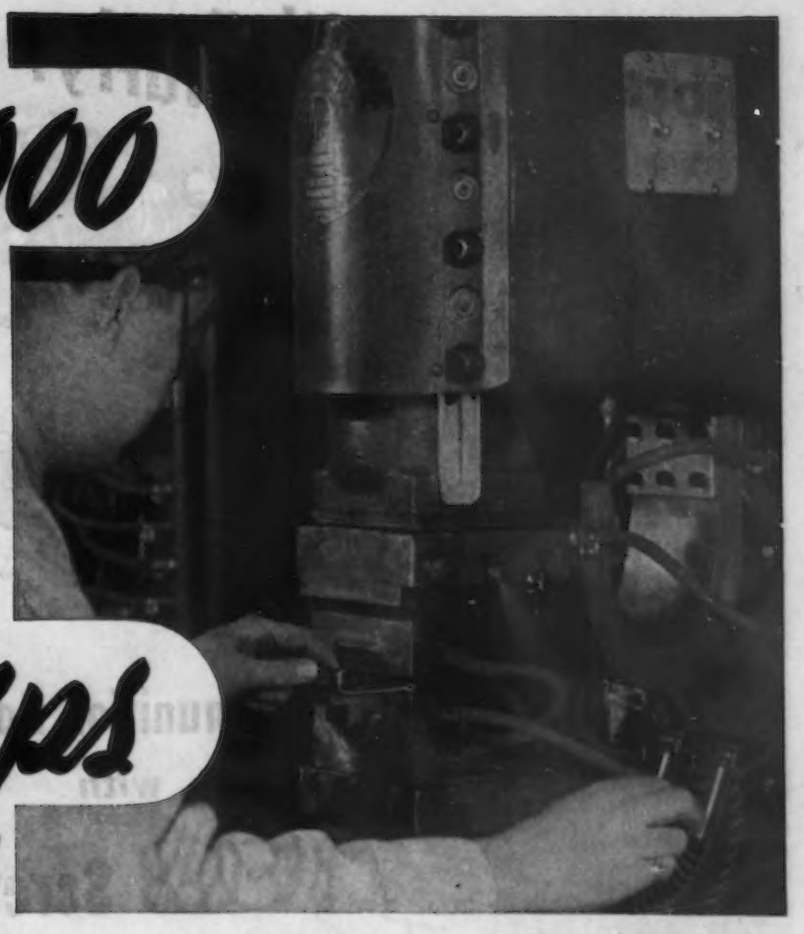
Richmond region: (Richmond Trust Bldg., Seventh and Main Sts., Richmond 19.) All of Virginia, Maryland, District of Columbia, and all of West Virginia except Brooke, Hancock, Marshall, Ohio, Tyler and Wetzel Counties.

St. Louis region: (Victoria Bldg., 407 North Eighth St., St. Louis 2.) All of Missouri, except Andrew, Atchison, Barton, Bates, Buchanan, Cass, Clay, Clinton, DeKalb, Gentry, Holt, Jackson, Jasper, McDonald, Newton, Nodaway, Platte, Vernon and Worth Counties; 44 counties in Illinois; and Sullivan, Greene, Knox, Daviess, Martin, Gibson, Pike, Dubois, Posey, Vanderburgh, Warrick, and Spencer Counties in Indiana.

Salt Lake City region: (Dooly Bldg., Salt Lake City 1.) All of Utah; 34 counties in Idaho; and

Welds 2000 Steel hasps per hour





That's the job one PROGRESSIVE projection welder has been doing, hour after hour, day after day. The unusual output rate, without requiring automatic loading, is made possible by two things:

1. The positive and consistent operation of PROGRESSIVE equipment.
2. Designing the part and dies so that locating and clamping is unnecessary.

Four small projections are stamped into the metal near the hinge eyes in the forming operation. To secure the eyes, the hasp is merely laid on the lower die of the welder. The upper die comes down, current comes on automatically, and welds the eyes closed at the projections.

In projection welding, accurate locating with reference to electrodes is usually unnecessary. Frequently simple flat welding dies can be used. An air hose coupled to a solenoid valve blows the part off the die into a basket when the operation is completed and the machine head raises.

PROGRESSIVE field engineers, backed by a greatly expanded staff of design and application engineers selected from the resistance welding industry for their breadth of experience and "results", will be glad to help you simplify and speed up your assembly and welding operations.

ARE YOU RECEIVING PROGRESSIVE'S "WELDING PICTORIAL"?

Ask for it on your Company Letterhead.

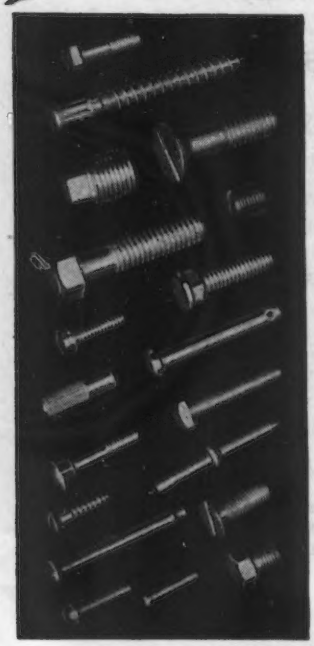
PROGRESSIVE WELDER CO.

SEAM PROJECTION & BUTT • *Electric Welding Equipment* • PORTABLE GUN & PEDESTAL

3050 E. OUTER DRIVE • DETROIT 12, U. S. A.

More Ammunition . . . in a Hurry!

Ammunition Boxes *with* *Elco Screws *made of* KEYSTONE Wire*



Elco screws and bolts . . . though insignificant in relation to the size of the completed product on which they're used . . . play a major role in production and assembly. Literally millions of them, of every conceivable shape and size, find their way into countless items for both war and peace.

The versatility of Elco screws and bolts is matched by the Keystone wire from which they are made. Whether the needs call for special analysis or what-have-you, Keystone delivers quality wire that "fills the bill."

Soon, we hope, Keystone wire will be available for civilian production in greatly increasing amounts.

*Elco Tool & Screw Corporation, Rockford, Ill.

KEYSTONE STEEL & WIRE CO.
PEORIA 7, ILLINOIS

Special Analysis Wire for All Industrial Uses

SAMSON SPRING WIRE

Coppered, Tinned, Annealed, Galvanized

Clark, Elko, Lincoln and White Pine Counties in eastern Nevada.

San Antonio region: (Alamo National Bldg., San Antonio 5, Tex.) The 52 counties in southern Texas.

San Francisco region: (200 Bush St., San Francisco 4.) All of California, except Imperial, Inyo, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara and Ventura Counties in southern part; all of Nevada; except Clark, Elko, Lincoln and White Pine Counties in eastern part; and Klamath and Lake Counties in southern Oregon.

Seattle region: (Dexter Horton Bldg., Seattle 1.) Sixteen counties of Washington.

Spokane region: (Columbia Bldg., Spokane 8.) Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman and Yakima Counties in the eastern part of Washington; and 10 counties of northern Idaho.

The location of the 10 branch sales offices which have just been opened by RFC follows: Kahl Bldg., Room 503, Davenport, Iowa; Victory Bldg., 212 Ninth St., Pittsburgh; Big Four Bldg., 230 Ninth St., Cincinnati; 500 Elk St., Buffalo, N. Y.; Maryland Trust Co. Bldg., Baltimore; Portland Bldg., Room 407, Washington, D. C.; Hunt Bldg., Tulsa, Okla.; Shrine Bldg., Memphis, Tenn.; Room 1315, Hamilton National Bank Bldg., Chattanooga, Tenn.; El Paso National Bank Bldg., El Paso, Tex.

Saves Money, Gets Award

Chicago

• • • **For his design** of a shell packing device credited with **saving the** government over $4 million annually, James Van Buskirk, a civilian employee of the Chicago Ordnance District, has received a $250 award under the War Department's suggestion system.

Mr. Van Buskirk simplified the design of the "packing stop," a horseshoe shaped device used in packing 105 mm. howitzer shells in fiberboard packing containers. The stop prevents the possibility of the fuze striking the top of the container and being detonated.

The new design permits flat stamping of the piece instead of drop forging formerly employed. The change reduced the cost of the stop from 9½c to 3¼c.

HEAT TREATED ALLOY STEEL CASTINGS

That's our Dish

Illustrated above is a typical group of carrying bogies and spindles—cast in Pittsburgh special PSF-developed analysis and heat treated to 400-500 Brinell on all wearing surfaces. If desired, jobs like these are also cast in carbon steel, and PSF heat treating techniques and facilities get results with carbon steel that you'd find very interesting. • Where your problems involve heat treated castings, let us work with you.

47 YEARS OF STEEL CASTING KNOWLEDGE

Pittsburgh

STEEL FOUNDRY CORPORATION

GLASSPORT, PA.

Sales Offices: NEW YORK • PHILADELPHIA • CHICAGO • CLEVELAND • CINCINNATI • AKRON • WASHINGTON, D. C.

W&D 9864

One GOOD INVESTMENT PROMOTES another

Cited for extraordinary usefulness and efficiency beyond the call of duty—the flexible, tireless

Pallet and CLARK fork truck

the extraordinary pair that speeds the flow of munitions, food and supplies to the point of use.

To see the wide range of usefulness of Clark Tructractors and Fork Trucks, send for handy 72-page pocket catalog—describes 60 husky, well engineered vehicles, gas and electric powered.

Another PRODUCT of CLARK EQUIPMENT COMPANY

CLARK TRUCTRACTOR
BATTLE CREEK, MICHIGAN, U.S.A.

Products of CLARK • TRANSMISSIONS • ELECTRIC STEEL CASTINGS AXLES FOR TRUCKS AND BUSES • AXLE HOUSINGS • BLIND RIVETS INDUSTRIAL TRUCKS AND TRACTORS • HIGH-SPEED DRILLS AND REAMERS METAL SPOKE WHEELS • GEARS AND FORGINGS • RAILWAY TRUCKS

Tool Engineers Advise Low Milling Speeds To Chicago Chapter, ASTM

Chicago

• • • Advantages of relatively low cutting speeds, approximately 500 surface fpm; for carbide steel milling as compared with those usually recommended of 1000 to 3500 surface fpm were discussed at a recent meeting of the Chicago Section of the ASME by J. B. Armitage and A. O. Schmidt, engineers of the Kearney and Trecker Corp.

A milling cutter with negative radial rake angles requires more power at the machine spindle than the same cutter with positive radial rake angles. This is said to hold true for conventional cutting speeds as well as for higher cutting speeds up to 1180 fpm.

A milling cutter with a 15° or 30° positive radial rake angle and with a negative face one to two times the maximum feed per tooth in width was found to be an effective cutter design. This type of cutting edge combines the inherent strength of negative radial rake angles at the cutting edge with the lower power requirements of positive radial rake angles.

High cutting speeds, from 1000 to 3500 surface fpm, have been reported and frequently recommended for steel milling operations. In many instances, behind these recommendations is the belief that definite advantages can be realized from extremely high cutting speeds. From this investigation and observation of numerous production operation setups, it has been found that speeds between 1000 and 3500 fpm are not to be generally recommended for carbide steel milling.

One of the primary factors in determining cutting speeds for steel is the power actually available at the machine spindle. A second factor which must be considered is whether the cut to be taken is roughing or finishing. Surface finish of the workpiece very often determines the selection of proper cutting speeds and feeds.

In rough milling operations on steel, the heaviest cut campatible with the condition of the machine and available power sould be taken. The use of heavy feeds per tooth, form 0.010 in. to 0.015 in., at cutting speeds from 350 fpm to 750 fpm will require less power to remove a given amount of metal than operations at higher

NO. 11 BLANCHARD SURFACE GRINDER ▶

"Put it on the Blanchard"

Get These Advantages

- **Production ✓**
- **Adaptability ✓**
- **Fixture Saving ✓**
- **Operation Saving**
- **Material Saving**
- **Fine Finish**
- **Flatness**
- **Close Limits**

These cast iron bushings are held on the magnetic chuck and because of their height, almost twice their diameter, they need to be securely blocked by steel parallels and blocks.

The outside diameter of the bushings is 1⅜" and the inside diameter ¾" and they are 2½" long.

.010" of stock is removed from each end to limits of ±.005". Two sides are ground, 60 pieces (120 surfaces) per hour.

Note that in this, as in most other setups on the Blanchard, all holding is magnetic and the machine can be cleared for other work in a few seconds.

Send for your free copy of "Work Done on the Blanchard", third edition. This new book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

BLANCHARD

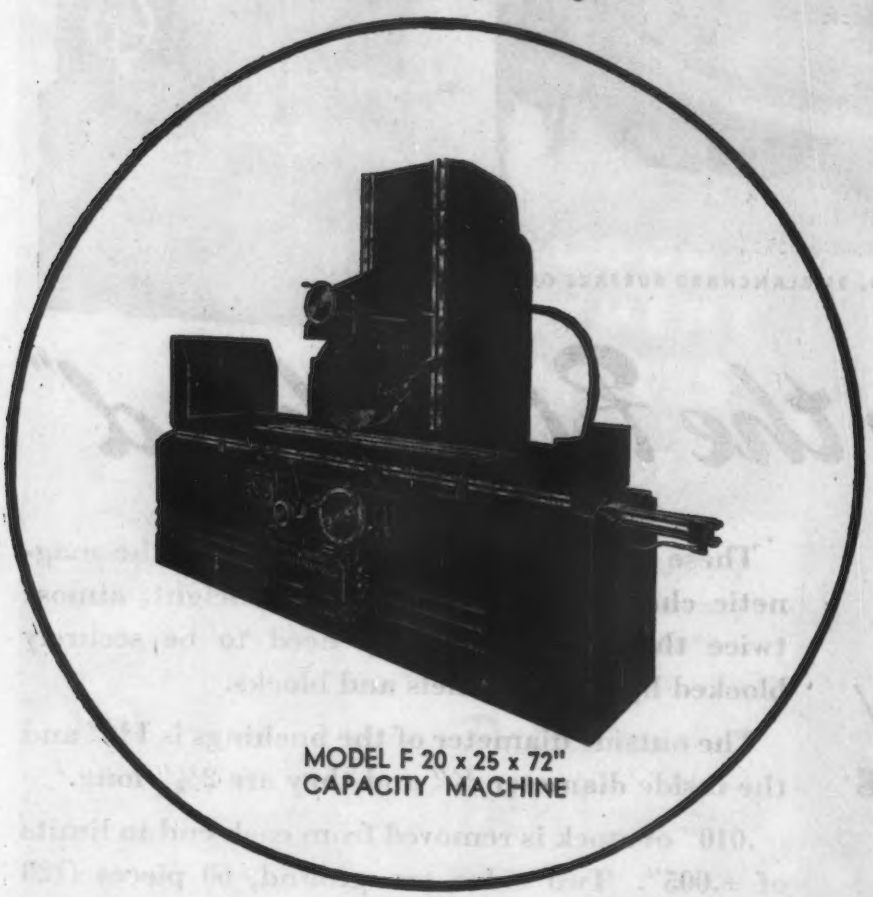
The BLANCHARD MACHINE COMPANY

64 STATE STREET, CAMBRIDGE 39, MASS., U. S. A.

GRAND RAPIDS

PRODUCTION TYPE HYDRAULIC FEED SURFACE GRINDERS

are meeting the most exacting needs of Army, Navy and Air Corps contractors requiring maximum production in surface grinding.



MODEL F 20 x 25 x 72" CAPACITY MACHINE

THE MACHINES ARE BUILT IN TWO TYPES:

MODEL "F" in sizes from 16 x 25 x 48" to 20 x 25 x 72", with maximum table speed of 150 F.P.M.

MODEL "A" in sizes from 12 x 18 x 36" to 14 x 18 x 72" with maximum table speed of 125 F.P.M.

Send for Bulletin 443

IF INTERESTED IN MODERN HIGH SPEED SURFACE GRINDING

GALLMEYER & LIVINGSTON CO.

200 STRAIGHT AVE., S.W.

GRAND RAPIDS 4 MICHIGAN

speed with smaller chip loads.

Operations with heavy chip loads will generally result in a coarser finish than a high speed operation with small chip loads. However, if a relatively good surface finish is desirable, recommended practice would indicate a heavy roughing cut to be followed with a light, high speed finishing cut.

Many factors affect the life of the tool between regrinds. Mechanical failure, under which breaking, cracking, checking, or fracture of the tool tip may be grouped, is most commonly encountered in tool breakdown. Such failures may have several sources; improper handling or grinding, extremely hard workpieces, incorrect grade of carbide, excessive vibration in the cut, cutting edges not designed, or incorrectly designed, for the operation at hand. However, despite the fact that these factors have been investigated and their detrimental effect reduced to a minimum, there are others, invariably present, which will affect tool life in any cutting operation. Among these are the friction between the chip and the cutting edge of the blade and the heat generated by the friction, both of which are concentrated in the zone immediately around the cutting edge. They generally will cause tool failure more rapidly at high cutting speeds than at low cutting speeds.

The influence of cutting speed on chip formation relative to the wear at the cutting edge of a blade is apparent in a series of illustrations. The chips produced by the individual blades are arranged progressively in columns. At low speeds the chips are uniform and the tips show little sign of wear. As speeds are increased the blade begins to show definite signs of wear; a crater begins to form behind the cutting edge, the tip takes on a blue temper color, the chips are oxidized and start to curl more tightly. Because of the increased speeds, and higher temperature of the cutting edge, the abrasive action of the moving chip tends to wear the tip more rapidly. As this wearing, dulling action continues, chips tend to alter in shape to conform to the crater being formed in the blade. Depth of crater after removing a given volume of metal varies almost directly as the cutting speed.

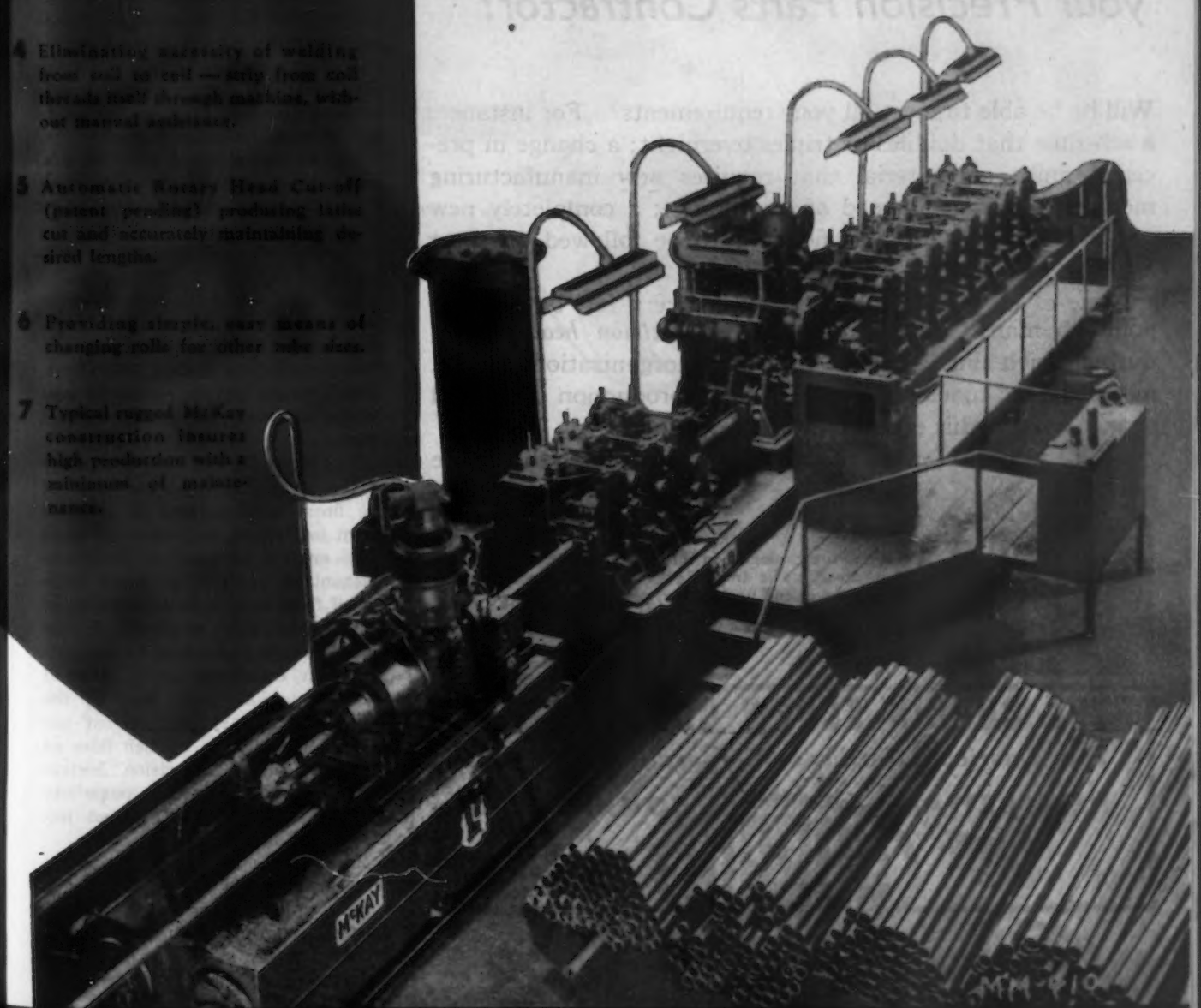
An analysis of the illustrated results indicates that there is an upper and lower limit of cutting speed in steel milling practice at which the tungsten carbide will give best results. A cutting speed of approxi-

McKAY

Resistance Weld

TUBE MILLS

PRECISION BUILT FOR CONTINUOUS PRODUCTIO



The **McKAY MACHINE** *Company*

ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

Machine illustrated above is a comp
Tube Mill, capable of producing 2"
to 4½" O.D. tubes from 16 ga. to
flat strip. McKay builds Tube Mil
sizes ranging from ¾" O.D. We

What's back of your Precision Parts Contractor?

Will he be able to meet all your requirements? For instance: a schedule that doubles or triples overnight; a change in precision finish or material that requires new manufacturing methods (grinding instead of machining); a completely new set of blueprints and specifications to be followed on short notice . . .

None of us can look into the future very far, but *we* can point to many years' experience as *precision headquarters*, during which time we have built up an organization of men, materials and machines geared to high production and rapid change-over in this exacting work.

Look to Corbin for your Precision Parts and face the future calmly!

Facilities are explained in this bulletin — which you will find in Sweet's File 4m10 for Product Designers. If you prefer that we send you a copy, please request it on your letterhead.

P-4

THE CORBIN SCREW CORPORATION

The American Hardware Corporation, Successor

NEW BRITAIN CONNECTICUT

CORBIN

See Sweet's Product Design Catalog, outline of Corbin Products and Facilities

Precision Parts

mately 500 surface fpm will result in good chip formation. As the cutting speed is increased, wear at the cutting edge and, consequently, changes in tool angles become more pronounced.

A fine chip of 0.0005 in. thickness will cause more abrasive wear at the cutting edge than a coarse chip of 0.010 in. per tooth.

Alien Patent Seizure Yields $150 Million In American Products

Kansas City, Mo.

• • • Of the 45,000 patents and patent applications seized by our government from enemy aliens and nationals of occupied countries, 9366 of the inventions have been licensed to 760 American firms and individuals.

This was announced by Dexter North, Washington, chief of patent administration of the Alien Property Custodian's office, who visited Kansas City to officially turn over complete working drawings on this collection to the Midwest Research Institute.

Mr. North explained that the government is anxious to "put these enemy patents to work for the benefit of American economy," and his office has evidenced much interest in making them available to this region.

Said to be the largest block of patents under one control, there is included about 29,000 of German origin, 7800 French, 1800 Italian, 1300 Dutch, 1200 Japanese and the remainder miscellaneous enemy and enemy occupied origin.

It is generally conceded that many of the inventions represent some of the finest achievements of research talent in Europe, and cover processes which enabled Axis nations to carry on mechanized warfare for years while cut off from such essential supplies of basic raw materials as petroleum, rubber, certain nonferrous and alloy metals, sugar, cotton and wool. Many of the patents have been used by the Allies for military use against our enemies particularly in such lines as synthetic rubber, precision instruments, high test gasoline, parachute shrouds, chemical warfare and improvements in airplanes.

Many of the ideas incorporated in the seized patents will be of value in postwar adaption such as in dyestuffs, plastics, pharmaceuticals, electrical goods, synthetic shellac manufacture, waterproofing of cloth, quick freezing, magnetic alloys and processes for making rayons.

What would be your Total Time on this Hot Press Die Job?

Courtesy —
Revere Copper & Brass Inc.
Dallas Division

This Hot Press Die, used for hot pressing spigot handles, was completed in a total time of 9 hours on a Milwaukee 2D Rotary Head Milling Machine. Compare this job report with your own methods:

Material — Hot Work Die Steel
Operation — Sink Cavities Complete
Time Distribution — Mill Cavities - 6 hrs.
bore core holes - - - - - - - - 1 hr.
drill ejector pin holes - - - - - ½ hr.
mill relief around impression - - 1½ hrs.
Total Time - - - - - - - - - 9 hrs.

Check these advantages of the Milwaukee Rotary Head Milling Machine and how you can benefit from them in your own shop:

DIRECT . . . mills intricate shapes in a single setup without the aid of templets or models — transmitting blueprint dimensions and outlines directly to the workpiece.

ACCURATE . . . chances for error are eliminated because there is no change in setup. Exact control of all combinations of cutting movements — possible only with this machine — transmits mathematical precision to the work.

FAST . . . initial job preparation and setup time are reduced to the minimum. Accurate performance of the machine saves operator's time and results in rapid production of work otherwise difficult to perform.

Write for Bulletin No. 1002C and complete information.

BUILDERS OF MILWAUKEE ROTARY HEAD MILLING MACHINE • MIDGETMILL • SPEEDMILL • FACE MILL GRINDER • AUTOMETRIC JIG BORER • CENTER SCOPE.

Kearney & Trecker
Products
CORPORATION
Milwaukee 14, Wisconsin
Subsidiary of Kearney & Trecker Corporation

8 TO 16 HEATS IN 8 HOURS WITH A DETROIT ELECTRIC FURNACE

Outstanding engineering and design principles assure volume production with a Detroit Rocking Electric Furnace—as many as 8 ferrous or 16 non-ferrous heats in one 8-hour day. These modern, speedy units likewise assure quality, for they provide automatic stirring action under non-oxidizing conditions and precise control over time, temperature, and composition. Their closed-chamber construction together with the absence of combustion products reduces dirt and fumes to a minimum. They save both labor and material. Versatile, flexible, fast, Detroit Electric Furnaces are a sound investment in economical production of high quality castings. Available in seven sizes with capacities from 10 to 8,000 lbs. Write for complete facts.

DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

Precision Founding

(CONTINUED FROM PAGE 64)

when thoroughly treated in this manner the mold is put back into the mantle and the cover replaced. (Never expose either a glue or a moulange mold to the air for a longer period than absolutely necessary.) Allow the treated mold to set for a few hours.

This treating with alum hardens the mold's working surfaces and so sharpens impressions. After all alum has been meticulously brushed out of the mold it is again given a dusting with talcum powder which is brushed out at once. The mold is now ready for use.

Plug up the tapered hole in the mantle with clay to within ⅛ in. of its mouth. This prevents plaster from getting all the way into this hole in the casting of try patterns. The reason why this hole is not plugged flush with its opening will be made clear in Part IV.

[*The technique of duplicating the original wooden pattern in any number of plaster try patterns will be described in a subsequent issue.*]

Formation and Structure Of Iron Oxide Films

(CONTINUED FROM PAGE 65)

The case of cobalt is more complicated than that of nickel insofar as two oxides are formed, namely, CoO and Co_3O_4. However, Co_3O_4 is not stable above 1634 deg. F. and above this temperature the similarity between cobalt and nickel is considerable. The spacing of the CoO film is 4.2548 A° at the film-air boundary and4.2508 A° at the film-metal boundary. The difference is larger than for nickel but smaller than for iron, and the rate of oxidation as well is intermediate between those of iron and of nickel. The microcrystals of CoO are distributed at random near the metal. Near the outer surface the cube faces are, as are those in nickel oxide, inclined at an angle of 10 deg. to the film plane.

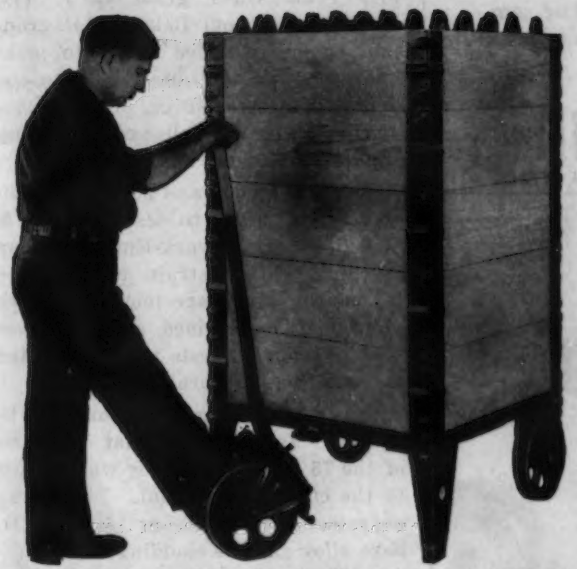
Airliner Converting Under Way

Santa Monica

• • • Eight rebuilt DC-3 air liners for commercial use have rolled from the assembly lines of the Douglas authorized conversion and overhaul centers recently established in California, Texas and Canada, Douglas Aircraft announced recently. Deliveries have been made to Western, Mid-Continent, TWA, American, Braniff and ABA-Swedish air lines.

SAVE 50% FLOOR SPACE EQUIPMENT COST LABOR COST

With the TURNER SYSTEM OF MATERIALS HANDLING



"Deliver the Bin and Save the Handling" is typical of "Turner System" savings. One man does the work of several — and there is no muss or fuss.

The Turner System is a scientifically standardized scheme of interlocking and interchangeable units which can be applied to every plant operation. It is designed to cut labor costs, to save space, and to reduce materials handling accidents.

Bin Sections are removed as the load diminishes and placed on the "empty" to build its capacity.

An amazingly flexible and efficient materials handling procedure has been built around the system. Its foundation is the perfect square. The ruggedly built "Transport" can be moved in restricted space with the hand "Jimmy," Power Lift Truck, Crane, Tractor or Conveyor.

FLOOR PLATE DECK TRANSPORT provides point contact with hot materials. Non-skid embossments hold materials on deck.

"Deliver the Bin and Save the Handling"

Platform or fork-lift trucks handle the Transport efficiently.

This Book Will Explain the "Turner System"

Industrial Engineers have long used the TURNER SYSTEM in their work to increase plant efficiency. You can get a complete outline of it in a twenty-page book sent to established companies. Write on your letterhead for your copy.

60 Days Free Trial

We are so sure that you can benefit from the use of this system that we are willing to ship an assortment of standard units for 60 DAYS FREE TRIAL. Use them for at least two months. Keep them if (in YOUR opinion) they save labor, time and space. Return them if they don't. There is absolutely no obligation, except that you assume nominal transportation charges.

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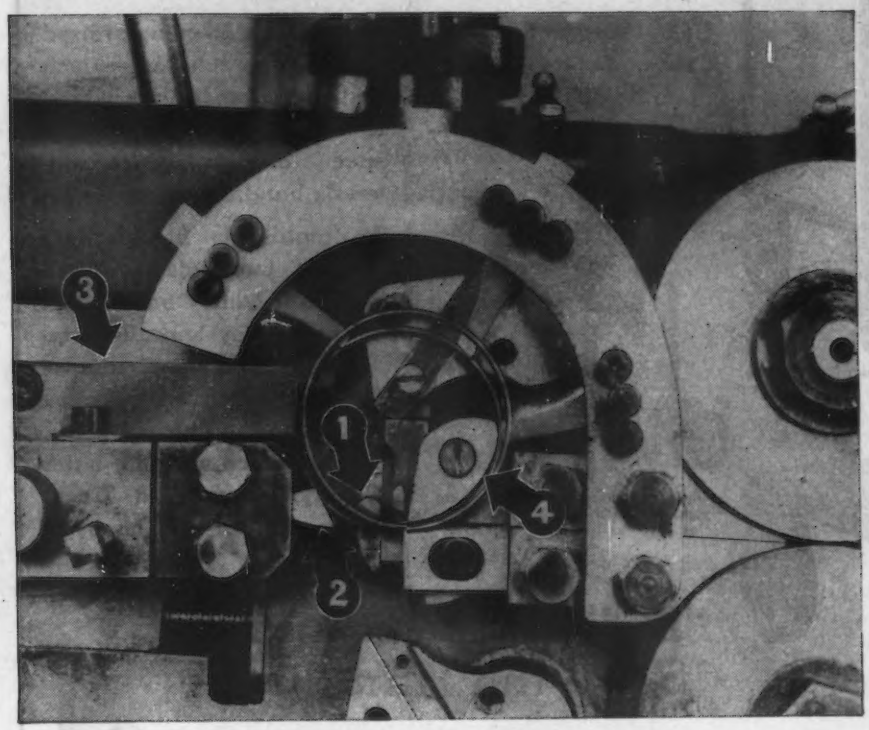
TORRINGTON
Force Feed Mechanical
LUBRICATOR

Positive, never-failing force-feed bearing lubrication. Design flexibility also enables power takeoff from machine to front, rear, side or bottom by ratchet or rotary means. For complete information write, stating number of feeds and drive desired.

THE TORRINGTON
MANUFACTURING CO., TORRINGTON, CONN.



HELPS TO GREATER ACCURACY *in Spring Coiling*

No. 17 Large Diameter Ring Coiling

The forming of rings approximately two times the normal maximum diameter is possible on standard Torrington Spring Coilers, by use of the attachment illustrated.

The attachment consists of a torsion attachment tool holder with an inserted bending arbor (1), an angular coiling point (2), a preliminary pitch tool (3), a specially formed pitch tool (4), for each diameter, which also serves as a cap guide inside the second coil, and a horseshoe-shaped arm (5), which holds adjustable guide fingers.

The rings are cut on the second coil, keeping concentricity within satisfactory limits. One coil remains in the "horseshoe" at all times, the cutter being recessed to clear this coil.

Both grooves in the block guide are used. The inner groove guides the wire approaching the coiling point; the outer guides the wire for cutting and acts as an anvil for the cutter tool.

August 16th—Use of Coiling Rolls

THE TORRINGTON
MANUFACTURING COMPANY
TORRINGTON, CONNECTICUT

FEATURE CONTINUATION

Influence of Overaging On Aluminum Alloys

(CONTINUED FROM PAGE 67)

prepared corrosive solution made up of 57 grams U.S.P. grade NaCl, 10 cc. H_2O_2 (30 per cent) Baker's C.P. grade and enough distilled water to make one liter. To determine the type and extent of attack, 30 cc. of the corrosive solution was allowed for every square inch of area immersed.

The uncorroded and corroded specimens were pulled to destruction in a 60,000 lb. Southwark-Emery testing machine. Stress-strain curves were taken for each specimen, and the yield load determined using 0.2 per cent offset. All tests were conducted at room temperature.

Results of the tests, summarized in Tables I and II, show that corrosion of the 75 S-T Alclad alloy was limited to the cladding material. There was no evidence of corrosion between the base alloy and the cladding, or of copper diffusing from the base alloy after aging at any of the selected temperatures. There was very little difference between the mechanical properties of corroded and uncorroded specimens, however, all specimens aged above 250 deg. F. were severely affected, resulting in much lower mechanical properties.

The corrosion induced in alloy 61S in both the W (solution heat treated but not artificially aged) and T (fully heat treated and age hardened) conditions was intergranular, accompanied by undermining pitting of a severe nature. There was little difference in the mechanical properties of the corroded and uncorroded specimens because the comparatively short period of exposure of the specimens to the accelerated corrosion medium caused only shallow pitting. The mechanical properties of 61S-W and 61S-T are adversely affected by aging at elevated temperatures although not to such proportions as is 75S-T Alclad.

After aging at elevated temperatures Alclad 24S alloy in conditions T80, T81 and T86 showed evidence of copper diffusion from the base alloy into the cladding. Undermining pitting and intergranualar corrosion resulted, the former being more prevalent. The extent of the attack was severe enough to cause a noticeable difference between the mechanical properties of the corroded and uncorroded specimens. The mechanical properties of 24S Alclad in any of the

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WITHOUT OBLIGATION

If dust problems are clouding your production efficiency and adding unnecessary expense to your costs, be sure to write for this publication. It emphasizes the importance of suppressing dust, and explains the Dustube method of *controlling* dusts in the harmful, low micron ranges. Ask for Bulletin No. 112.

Knocked-down type

Assembled type

Series "B"

The Dustube is a simple, cloth bag type filter that combines all three major essentials of a good dust collector: 1. High efficiency; 2. Simplicity of installation, operation, and inspection; 3. Low operating and maintenance costs.

Dustubes are supplied in a wide range of sizes and in three types, as illustrated above, for handling air volumes from 270 CFM up.

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dustube DUST COLLECTORS

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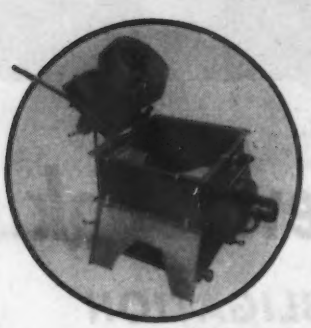
ENGINEERED BY BUILDERS OF THE FAMOUS AIRLESS WHEELABRATOR

THE UDYLITE
MULTIPURPOSE BARREL
FOR BULK FINISHING OF SMALL PARTS



FOR DRYING

FOR CLEANING

● The MULTIPURPOSE BARREL is designed to handle a one basket load. It loads and unloads easily and quickly —no hoist required and no doors to fuss with. Cup-shaped parts can be revolved at drain position for minimum dragout.

All gears and bearings are above solution level. A choice of cathode fixtures assures constant, positive contact with any size or type of load.

This equipment is available in various combinations of cylinder and tank construction for tumble cleaning, electrocleaning or cyanide plating, acid plating, acid tumbling, rinsing or drying. It's just what you have been looking for. State your requirements when writing for prices.

THE Udylite CORPORATION
1651 EAST GRAND BOULEVARD
DETROIT 11, MICHIGAN
REPRESENTATIVES IN ALL PRINCIPAL CITIES

above conditions drop upon aging at temperatures above 250 deg. F.

Conclusions

From the results of these tests, it can be seen that the mechanical and corrosion inhibiting properties of 75S-T Alclad are least affected by temperatures up to 250 deg. F. of all the alloys tested. Above 250 deg. F. the mechanical properties of 75S-T are severely adversely affected, but its resistance to corrosion is relatively unimpaired.

24S Alclad in conditions T80, T81 and T86 show a marked decrease in corrosion resistance when overaged at temperatures above 250 deg. F. while marked intergranular corrosion is evident in 61S alloy when overaged at temperatures above 250 deg. F.

Domestic Freight Car Inquiries Total 22,500

Pittsburgh

• • • Domestic freight car inquiries have boomed to a total of 22,500 cars, orders for which have not yet been placed with car builders, while 1945 production of freight cars for domestic service alone is expected to total about 55,000. These new inquiries have hit the market hard after a period when inquiries were both few and light. Practically all the major roads are shopping the car builder circuit hunting homes for car orders. Deliveries on these cars is not possible before next year, for the reason that if accepted by car builders now, they would come under fourth and first quarter steel commitments.

In addition to the domestic car business, army and foreign car buying is active. The army has orders placed now for 12,795 cars for the Pacific, mainly the Philippine Islands, which are wanted this year but will not likely be delivered before late January or February of next year. On much of this business, the steel deliveries are running late third and early fourth quarter.

Pullman-Standard Car Mfg. Co., at Michigan City is working on an order for 1200 troop sleepers and American Car & Foundry Co., Berwick, Pa., is building 400 troop kitchens. Delivery of these units will start shortly and continue through to about Sept. 1.

French orders with American car builders total 36,750 freight cars that are wanted this year but which will hardly be delivered before July of next year. Likewise, orders for 6000 cars for India will probably be late second quarter, 1946, delivery.

Compare
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PERFORMANCE
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ARC WELDER

Hobart's performance alone will prove to you that it is the most outstanding arc welder on the market today. However, don't stop the comparison with performance . . . because Hobart "Simplified" Arc Welding has many more time and money saving advantages. Try its Multi-Range Dual Control and exclusive Remote Control that gives you the correct welding heat for every type of electrode and for every application. Don't overlook its liberal design and quality construction for severest use and long life.

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PROMPT DELIVERY when suitable priority accompanies your order . . .

HOBART'S "Arc Welding Design Service" is yours for the asking! FREE!

HOBART
"One of the World's Largest Builders of Arc Welders"

SPB Control Of Foreign Disposals

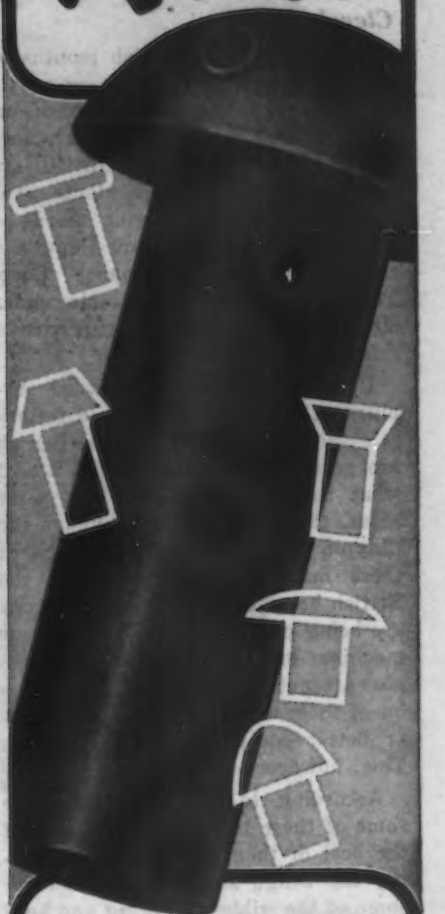
(CONTINUED FROM PAGE 110)

made, particularly by the Navy, in securing itemized invoices; however, immediate attention must be given to the clarification of lend-lease accounting if a clear, factual basis for the settlement of lend-lease accounts is to be achieved.

Conclusion No. 10. — Artificially fixed rates of foreign exchange applicable to American nationals in Europe have resulted in these persons, of whom the vast majority are members of our armed forces, taking a serious financial loss on their purchases abroad. They impose upon the American soldiers a burden which they should not be asked to assume. The alleged purpose of these exchange regulations, which is to precent a flood of American money from breaking markets abroad, could be achieved in other and fairer ways. These rates create serious problems in the settlement of lend-lease accounts and in the disposal of surpluses abroad. A great deal of currency issued by the Axis and Axis-dominated governments was in the hands of collaborators who had produced war materials for our enemies. Adequate measures to isolate such war profits and impound them have not been taken. Each passing day since the invasion renders the impounding of such funds more difficult.

Conclusion No. 11.—The difficulties recited in conclusions No. 4, 5, 6, 7, 8, 9, and 10 result from the failure of our Government agencies abroad to obtain all the considerations we should have received in return for the huge contribution we have made in this war. Lack of a clearly established foreign policy over a very long period of years is a major contributing cause. Lack of coordination, and confusion among American agencies abroad, has exaggerated this condition. These conditions can be remedied by concentrating authority for each area in a single individual, by strengthening personnel which represents the United States abroad, and by providing them with adequate funds. There must be the closest coordination among the various agencies participating in foreign affairs, so that they can operate as a single efficient unit in the promotion of clearly defined objectives.

Oliver Rivets



Made in types, styles and sizes for all applications

The accurate size, uniform material and true-round shanks of Oliver rivets mean faster production of fabricated parts, firm grips, dependable joints.

To insure complete satisfaction in the rivets used in your operations, specify OLIVER!

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PITTSBURGH, PENNSYLVANIA
BOLTS . . . NUTS . . . RIVETS
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MACHINE TOOLS

. . News and Market Activities

Britain's Machine Tools Here Being Sold

Cleveland

• • • **In the first feverish** months of the war the British bought, primarily with private funds, some 20,000 of our machine tools for their subcontractors in this country. Now, the British are liquidating all of their plants over here and with an approving chorus of hozannahs from our State Dept. and the Reconstruction Finance Corp. They are selling these tools under circumstances somewhat suggestive of a black market.

Unlike the government-owned surpluses, these tools can be sold for resale and rumor has it that the British are getting something like 65 pct of what they paid for them. In some cases, this is considerably under the Clayton formula even though a lot of these machines were old when the British bought them. Evidently, they are being purchased now because new machines or equipment from the surplus are not available, and probably a lot of them will be scrapped when new or better equipment can be bought. This, however, remains to be seen.

According to reports, WPB froze some of these tools and took some of the best of them immediately following the Bulge affair, inspiration for some of the wildest ordering and buying the world has ever seen. As this would indicate, these sales have been going on for some time.

Some case can be made for the British on the basis of our benefit from the manufacturing operations on these tools, with our workers on the jobs and the profit from operating them. Also, it has been pointed out that if the British hadn't bought them, we would have had to do it ourselves and perform the work for the British anyway. In this case, the tools would have been ours and we would have had them to dispose of through the usual channels.

England is obviously entitled to salvage on these machines, but not at the present time the industry feels. Injection of 20,000 such machines into the market at this particularly queasy period in the economic life may result in no particular good to the machine tool industry. Like a lot of others, machine tool builders have been pretty thoroughly renegotiated and what market there is left should certainly be preserved for them, and the ultimate absorption of the government-owned surplus. Selling these tools now satisfies a limited and temporary demand, which could prove permanent.

It would have been better for the Defense Plant Corp. to take these tools from the British, give them the approximate salvage value and then dispose of these tools at a time when it would be more in the interest of our own machine tool industry. In this event, DPC could have given the British any profit made from the transaction and had there been a loss, it would hardly constitute a serious subsidy for our government to absorb it. In the past, the British and the Germans have never hesitated to encourage, nurture, and protect their machine tool industry at almost any cost, but even the present backlog and the surplus potential could not provide sufficient impetus for official action here.

Dealers have been getting in on these sales of British equipment and reports are going around to the effect that after a repainting job at least one dealer has been trying to get 95 pct of list for the equipment he has on his hands. OPA, so the story goes, tripped him up but then got involved in a debate as to what constitutes rebuilding a machine tool and there, apparently, the case rests.

Since new orders to our dealers are screened against the surplus and indeed, the surplus itself is in the process of screening to determine how many and what kind, it seems reasonable that these 20,000 tools should have been kept off the market until such time as the surplus was largely available and arrangements, perhaps including builders and dealers in the disposal, had been made. Whether or not these tools eventually become scrap is hardly the point—they are being sold when the market is a slammed door in the industry's face.

With the strings removed from their machine tool industry at home, the British are in an enviable position in regard to export business. They are able to give about a 60-day delivery and have before them not only the market of their own colonies, but that of France and Belgium as well. And even though France and Belgium may not prefer British machine tools, certainly the assorted colonies of the Crown will not be buying from us. This headstart the British builders have, negates a good share of the talk about foreign business by builders here with delivery dates running around six months at the earliest.

One major producer here has about six weeks open space left in his shop until the first of the year and it is certainly doubtful that any move can be made to take care of France and Belgium unless sweeping changes of a reconversion nature take place shortly. Expediency is a prime factor, as witness the case of France who has wanted to buy machine tools in amounts estimated variously from 1600 up into the thousands, a good part of which they tried to place with a company here. But the delivery dates were so discouraging, because of our own necessarily critical programs, that the French commission turned to England, ordered over 800 of them and got a 60-day delivery. This represents kind of tough competition. Also, there is Russia who back as far as 1936 was exporting a few machine tools to the Middle East.

With 10 years normal production of machine tool industry in the hands of the RFC, and the British permitted that particular leeway, seemingly reserved for them solely by Uncle Sam, there is a grim sort of humor in the remark of a dealer here that anybody is in the machine tool business who has been renegotiated.

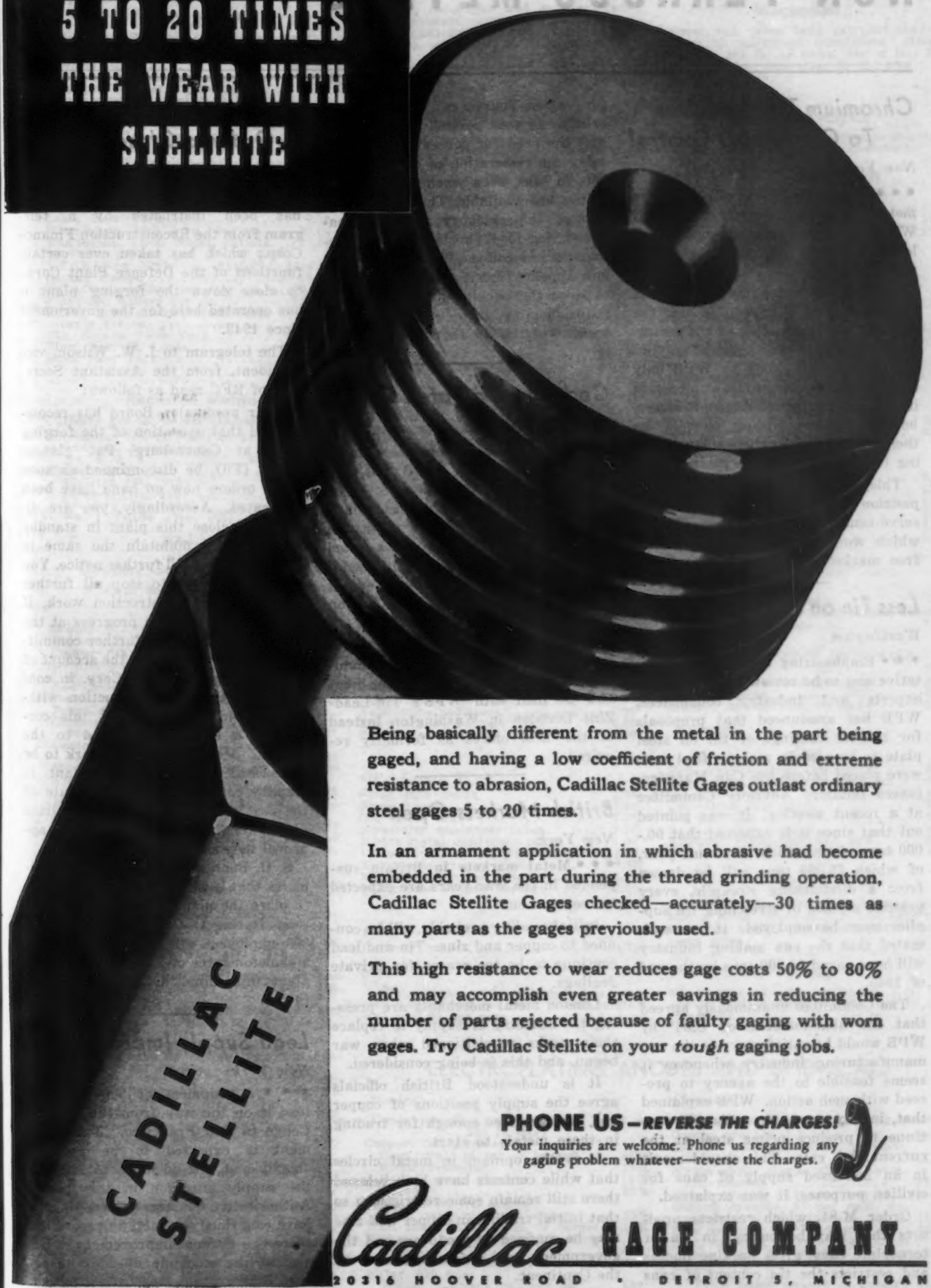
• •

Gun Cutbacks Free Ohio Machine Tools

Cleveland

• • • **Cutbacks in 50 caliber** machine gun production brought about the declaration of 850 standard general purpose machine tools as surplus at the General Motors Corp.'s Frigidaire Division, Dayton, Ohio, this week. Primarily milling machines and grinders, these tools are now being processed and will be shipped to the Reconstruction Finance Corp.'s warehouse in Cincinnati, Ohio. Among the equipment were two turret lathes, both of which were sold to war contractors at once.

5 TO 20 TIMES THE WEAR WITH STELLITE



Being basically different from the metal in the part being gaged, and having a low coefficient of friction and extreme resistance to abrasion, Cadillac Stellite Gages outlast ordinary steel gages 5 to 20 times.

In an armament application in which abrasive had become embedded in the part during the thread grinding operation, Cadillac Stellite Gages checked—accurately—30 times as many parts as the gages previously used.

This high resistance to wear reduces gage costs 50% to 80% and may accomplish even greater savings in reducing the number of parts rejected because of faulty gaging with worn gages. Try Cadillac Stellite on your *tough* gaging jobs.

PHONE US—*REVERSE THE CHARGES!*

Your inquiries are welcome. Phone us regarding any gaging problem whatever—reverse the charges.

Cadillac GAGE COMPANY

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NON-FERROUS METALS

. . . News and Market Activities

Chromium Tightness Due To Ore Import Control

New York

• • • **Chromium is one of only seven metals now considered critical by WPB, the others being nickel, tin, lead, cadmium, antimony and bismuth.**

Imports of chromium concentrate have been somewhat reduced over the past six months because of the recently established requirement of an import certificate, issued by WPB only after the concentrate is at dockside in the foreign port. Foreign producers, however, are unwilling to pile up their concentrate at their ports awaiting the issuance of a certificate.

This device is said to permit disposition of the higher cost Metals Reserve concentrates to consumers here, which would not be possible under free market conditions.

Less Tin on Food Cans

Washington

• • • **Emphasizing that they are tentative and to be reviewed by technical experts and industry committees, WPB has announced that proposals for thinner coatings of tin on steel plate to be used in making food cans were placed before the Can Manufacturers Industry Advisory Committee at a recent meeting. It was pointed out that since it is expected that 90,000 tons of tin will be used this year, of which 25,000 tons will be drawn from a diminishing stockpile, every possible method of stretching tin supplies must be employed. It was estimated that the can making industry will have saved 58,000 tons by the end of 1945.**

The Committee unanimously agreed that the abandonment of CMP by WPB would be satisfactory to the can manufacturing industry whenever it seems feasible to the agency to proceed with such action. WPB explained that, in any event, tin mills will continue to produce prime steel at the current high rate. This should result in an increased supply of cans for civilian purposes, it was explained.

Order M-81, which restricts products that may be packed in tin or terneplate cans, gives packing quotas and restricts the tin content of cans for various purposes, was discussed briefly. It was pointed out by WPB that the need for conserving tin may delay the restoration of certain products to cans, even when steel and facilities are available. The major products of this category are beer, spaghetti, dog-food, shortenings and vacuum-packed coffee. WPB also said it now appears that it may be impossible to raise the packing quotas of baked beans, hominy, motor oil and paints, because of the tin shortage.

Cadmium On Rated Orders

Washington

• • • **Cadmium has been placed under further restrictions, WPB has announced. This action was effected by amending order M-65. Purchasers may now order cadmium only when the metal will be used in filling a rated order. Permitted uses of the metal are listed in the order, to the extent that the metal is available for use on rated orders.**

The new amendment also provides that all appeals and other communications in reference to the order must now be filed with WPB's Tin-Lead-Zinc Division in Washington instead of the field offices as formerly required.

British Markets Open

New York

• • • **Metal markets in Britain suspended in the war years are expected to reopen soon.**

Initial trading probably will be confined to copper and zinc. Tin and lead continue to be too scarce for private dealings.

London metal merchants are pressing the ministry of supply to replace their stocks requisitioned when war began, and this is being considered.

It is understood British officials agree the supply positions of copper and zinc are free enough for trading in these metals to start.

It is the opinion in metal circles that while controls have been relaxed there still remain some restrictions so that initial trading in copper and zinc may be confined to producers and the government and a few countries on the Continent.

DPC Aluminum Plant Ordered Closed by RFC

Canonsburg, Pa.

• • • **The Aluminum Co. of America has been instructed by a telegram from the Reconstruction Finance Corp., which has taken over certain functions of the Defense Plant Corp., to close down the forging plant it has operated here for the government since 1943.**

The telegram to I. W. Wilson, vice president, from the Assistant Secretary of RFC read as follows:

"War production Board has recommended that operation of the forging plant at Canonsburg, Pa., plancor 1148-2 (F6), be discontinued as soon as all orders now on hand have been fabricated. Accordingly, you are directed to close this plant in standby condition and maintain the same in that condition until further notice. You are also directed to stop all further engineering or construction work, if any, which may be in progress at the plant and to make no further commitments of any nature for the account of Reconstruction Finance Corp. in connection with such construction without the prior approval of this corporation's engineer assigned to the project. A schedule of the work to be performed in placing the plant in standby condition and an estimate of the cost thereof should be submitted to the engineering division for approval as soon as possible."

S. H. Bennett, works manager, estimates that it will take at least 30 days to place the plant in a standby condition. During this time approximately 300 employees will be laid off, leaving a skeleton force of 75 to maintain the plant until final decision as to its future.

Lead Supply Improving

New York

• • • **A shipment of 3000 tons of lead is on the way from the Belgian Congo to San Francisco. This shipment is expected to be received shortly and will do much to improve the supply situation in this metal. Authoritative quarters in Washington have confirmed the fact, however, that there is a gradual improvement in the size of the stockpile due to the severe conservation measures in effect.**

Primary Metals

(Cents per lb., unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb.)	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be	$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb.)	$1.50 to $1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$3.00
Iridium, dollars per troy oz.	$120.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	$145.00 to $149.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	9.00 to 10.00
Aluminum, deoxidizing No. 2, 3, 4	$6.00 to 9.50
Brass Ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.37
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	23.00
Phos. bronze, A, B, 5%	....	36.50	36.25
Muntz metal	20.12	18.37	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb., subject to extras on page, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier: 2S and 3S, 21.2c.; 52s, 24.2c.; 61S, 22.3c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness: 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price: 17ST and 11ST-3, screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths, ¼ in., 34c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths, 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NONFERROUS SCRAP METAL QUOTATIONS

†*(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)*

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gilding metal turnings	8.50
Contaminated gilded metal solids	8.00
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00
Zincy bronze borings	8.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25[1]
Manganese bronze solids	6.25[2]
Manganese bronze borings	6.50[1]

OPA Group 4†

Refinery brass	4.75*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.63*
Cartridge Brass Turnings, Loose	7.87*
Loose Yellow Brass Trimmings	7.87*

Aluminum

Plant scrap, segregated

2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S	4.50
25S turnings, dry basis	3.00
Low copper alloys 51, 52, 61, 63S solids	7.50
turnings, dry basis	5.75

Plant scrap, mixed

Solids	4.00
Turnings, dry basis	2.75

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	5.00
Pistons, with struts	3.00
Old alloy sheet	5.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.48
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 26c per lb.; 90 to 98% Ni, 26c. per lb contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25½
Electrodeposited	18⅞
Rolled, oval, straight	19½
Curved	20⅝
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23⅝
Zinc, cast, 99.99, 15 in. or longer	16¼
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 1-9 troy oz., per oz.	58*

Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver cyanide, 100 oz. lots	.4179
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	33.00
Zinc sulphate, 99 per cent, crystals, bbls., frt. allowed	6.35

*Price based on use of foreign silver

SCRAP

. . . News and Market Activities

Turnings Market Continues Upward

Pittsburgh

• • • The expected jump in turnings prices here reflects the upward trend of the eastern and western markets during the past three weeks. All grades advanced except short shoveling turnings, where offerings at higher prices had no takers. However, if the short shoveling market does advance to ceiling, there might be expected a slackening off in buying of this grade for openhearth consumption. Likewise, at the present range of $14.00 to $14.50 on machine shop turnings, crusher consumption of this grade will decline. These influencing factors may keep these grades from moving to top-ceiling. On the whole, the scrap supply here is becoming increasingly scarce, and dealers are begging shippers for scrap. The decline in scrap production resulting from heavy cutbacks here plus the fact that scrap producing plants have tight labor supplies that cannot be diverted to moving scrap, are factors that are greatly influencing the market. One large consumer of machine shop turnings will continue out of the market for another month, and another heavy consumer in the district will probably not meet competition at higher prices than are now quoted on this grade. Valley mills are reported approaching ceiling price on machine shop turnings, and are paying $1.50 freight to move all grades of scrap into the area. As yet, Pittsburgh, consumers have not exceeded the $1.00 springboard.

•

CHICAGO—Scrap shipments to this district continue to be fairly heavy on allocations, while new allocations are still coming in. The over-all supply remains very tight, with the district reported to be in the strongest market in the country. Secondary grades are continuing the march to OPA ceilings, and those items at ceiling remain strong. Reports of mill purchases of short shoveling turnings at full ceiling price are unconfirmed, though an increase to $14.50 to $15.00 is indicated. Cut bolsters and side frames also moved strongly toward ceiling this week.

•

PHILADELPHIA—The market is firm here this week with turnings up another half dollar to a range of $12.50 to $13. Scrap of all grades is in demand, and one large consumer is reported to be badly in need of supplies at two plants. At a Navy yard scrap auction where unprepared scrap is offered, bids customarily range well below the ceiling price of $14. It is reported that 2000 tons were bid in at ceiling, a rise of $3.40 from early June transactions. Cast scrap continues in very short supply.

•

DETROIT—Turnings grade prices continued their strong upward move this week as the result of three factors—diminishing supply from cutback war plants, apparent considerable short positions in the trade, and heavier mill calls resulting from blast furnace shutdowns. Even at the higher prices comparatively little scrap was coming out, and still higher prices were generally anticipated. Electric furnace scrap is also becoming harder to get. Availability of heavy melting steel is little better, even though much miscellaneous material is coming into the market from plants which have obtained permission to scrap jigs and fixtures used on cancelled war production.

•

BOSTON—Shrinking supplies of machine shop turnings and of mixed borings and turnings, coupled with accelerated demand, has lifted prices $1 a ton to within $2.55 of ceiling. A yard has bought 1000 tons of steel shells, and a steel mill a large tonnage of arsenal scrap. Salvaged material from the Bethlehem-Hingham yard is still moving freely, and bids will be taken July 24 on about 1300 tons of Boston Navy yard scrap, 500 tons of which is unprepared. Foundry scrap continues in excellent demand. Generally, the market shows more life than in months.

•

NEW YORK—Turnings continue very strong here and have increased in price by 50¢. Scrap movement is said to be very poor with mills calling for delivery. Even turnings have dropped in volume due it is believed to the high prices reached, as well as the effects of cutbacks, labor shortage and summer weather. Turnings prices are nearly at the ceiling of $10.33. Cast scrap continues very scarce.

•

BUFFALO—Steelmaking scrap is distinctly tighter as the result of fairly heavy buying at a time when war plant and railroad offerings are shrinking. One of the larger rail lists is off about 50 pct this month from the tonnage a year ago and little of this, except possibly some light stuff, is expected to come here. Machine shop turnings are strong at $12.50 to $13, showing a 50 pct upturn at the outside figure. The chief consumer still is paying no brokerage, transportation tax, or springboard on turnings, and rejections are reported running higher. Sale of 2000 tons of unupper Lake area.

a local dealer is reported, although no price was mentioned. Canal shipments are coming through at a better rate and 5000 tons arrived this week from the upper lake area.

•

CLEVELAND—During the last few days mills inventories have hit a new low, scrap production is down an estimated 50 pct to 60 pct, largely because of cutbacks, and with strikes and vacations intermittently in progress the market situation is very tight. One major consumer brought electric furnace scrap for the openhearth last week and if the present situation continues others may be doing the same soon.

•

ST. LOUIS—The movement of scrap iron to the St. Louis industrial district continues light, principally because of the shortage of manpower to gather and process it. Because of the shortage of "hot metal" there, allocations to Chicago mills continue to take supplies usually going to St. Louis. However, the mills here are said to be comfortably situated as to inventories. Machine shop turnings up another $1 because of buying for other markets.

•

CINCINNATI—Extreme conservatism upon the part of district mill operators is curtailing activity in the market. Tonnage buying is almost absent from the market, but dealers report that trading at the present time is largely for application on old commitments. The demand for rails and good cast scrap, however, continues to be strong with these items holding to ceilings. Some moderate firming in the price background on turnings and borings, reflects a firmer position in other districts, but these items are still not overly active in the current market.

•

BIRMINGHAM—Interest continues to be shown here for blast furnace material but taken as a whole the market remains dull. Some movement of openhearth grades from Gulf ports to Northern mills is reported.

Machinery Dealers Elect

Chicago

• • • Victor Segal has been elected chairman of the Chicago chapter and Harvey H. Goldman of the Detroit chapter of the Machinery Dealers' National Assn. Mr. Segal is general manager of Victor Machinery Co. and has been associated with the machine tool business for 22 years. Mr. Goldman, who succeeds J. Lee Hackett, also is a member of the national board of directors and of the government-owned surplus machine tool committee of the association.

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4). Where ceiling prices are quoted they do not include brokerage fee or adjusted transportation charges. Asterisks indicate grades selling at ceilings.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting		$20.00*
RR. hvy. melting		21.00*
No. 2 hvy. melting		20.00*
RR. scrap rails		21.50*
Rails 3 ft. and under		23.50*
No. 1 comp'd sheets		20.00*
Hand bdld. new shts.		20.00*
Hvy. axle turn.		19.50*
Hvy. steel forge turn.		19.50*
Mach. shop turn.	$14.00 to	14.50
Short shov. turn.	16.00 to	17.00
Mixed bor. and turn.	14.00 to	14.50
Cast iron borings	15.00 to	15.50
Hvy. break cast.		16.00*
No. 1 cupola		20.00*
RR. knuck. and coup.		24.50*
RR. coil springs		24.50*
Rail leaf springs		24.50*
Rolled steel wheels		24.50*
Low phos. bil. crops		25.00*
Low phos.		22.50*
RR. malleable		22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting		$18.75*
No. 2 hvy. melting		18.75*
No. 1 bundles		18.75*
No. 2 dealers' bndls.		18.75*
Bundled mach. shop turn.		18.75*
Galv. bundles		16.75*
Mach. shop turn.	$13.25 to	13.75
Short shovel. turn.	14.50 to	15.00
Cast iron borings	13.25 to	13.75
Mix. borings & turn.	13.25 to	13.75
Low phos. hvy. forge		23.75*
Low phos. plates		21.25*
No. 1 RR. hvy. melt.		19.75*
Reroll rails		22.25*
Miscellaneous rails		20.25*
Rails 3 ft. and under		22.25*
Locomotive tires, cut	22.50 to	23.00
Cut bolsters & side frames	20.25 to	21.25
Angles & splice bars		22.25*
Standard stl. car axles	24.00 to	24.50
No. 3 steel wheels		23.25*
Couplers & knuckles		23.25*
Agricul. malleable		22.00*
RR. malleable		22.00*
No. 1 mach. cast.		20.00*
No. 1 agricul. cast.		20.00*
Hvy. breakable cast.		16.50*
RR. grate bars		15.25*
Cast iron brake shoes		15.25*
Stove plate		19.00*
Clean auto cast.		20.00*
Cast iron carwheels		20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting		$19.50*
No. 2 hvy. melting		19.50*
No. 1 bundles		19.50*
No. 2 bundles		19.50*
Mach. shop turn.	$7.00 to	7.50
Shoveling turn.	8.00 to	8.50
Cast iron borings	8.00 to	8.50
Mixed bor. & turn.	7.00 to	7.50
Low phos. plate		22.00*
No. 1 cupola cast.		20.00*
Hvy. breakable cast.		16.50*
Stove plate		19.00*
Scrap rails		21.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting		$15.05*
No. 2 hvy. melting		15.05*
No. 1 and 2 bundles		15.05*
Bushelling		15.05*
Turnings, shovelings		10.00
Machine shop turn.	$7.00 to	7.50
Mixed bor. & turn.	7.00 to	7.50
Cl'n cast, chem. bor.	13.06 to	14.15*

Truck delivery to foundry

Machinery cast.	21.00 to	23.51*
Breakable cast	21.57 to	21.87*
Stove plate	20.00 to	23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting		$17.32*
No. 2 hvy. melting		17.32*
No. 1 bundles		17.32*
New bushelling		17.32*
Flashings		17.32*
Mach. shop turn.	$10.50 to	11.00
Short shov. turn.	12.00 to	12.50
Cast iron borings	11.00 to	11.50
Mixed bor. & turn.	10.50 to	11.00
Low phos. plate	19.32 to	19.82*
No. 1 cupola cast		20.00*
Charging box cast	18.00 to	19.00
Hvy. breakable cast		16.50*
Stove plate	18.50 to	19.00
Automotive cast		20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting		$18.75*
No. 2 hvy. melting		18.75*
No. 2 bundles		18.75*
Mach. shop turn.	$12.00 to	12.50
Shoveling turn.	13.50 to	14.00
Cast iron borings	13.50 to	14.00
Mixed bor. & turn.	12.00 to	12.50
No. 1 cupola cast		20.00*
Hvy. breakable cast		16.50*
Cast, charging box		19.00*
Hvy. axle, forge turn.	17.50 to	18.00
Low phos. plate		21.25*
Low phos. punchings		21.25*
Billet crops		21.25*
RR. steel wheels		23.25*
RR. coil springs		23.25*
RR. malleable		22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting		$17.50*
Bundled sheets		17.50*
Mach. shop turn.		10.00
Locomotive tires, uncut		17.00
Misc. std. sec. rails		19.00*
Rerolling rails		21.00*
Steel angle bars		21.00*
Rails 3 ft. and under		21.50*
RR. springs		22.00*
Steel car axles		23.50*
Stove plate		19.00*
Grate bars		15.25*
Brake shoes		15.25*
RR. malleable		22.00*
Cast iron carwheels		20.00*
No. 1 mach'ery cast		20.00*
Breakable cast		16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting		$17.00*
No. 2 hvy. melting		17.00*
No. 2 bundles		17.00*
No. 1 bushelling		17.00*
Long turnings	$9.50 to	10.00
Cast iron borings	9.50 to	10.00
Bar crops and plate		19.50*
Structural and plate		19.50*
No. 1 cast		20.00*
Stove plate		17.00
Steel axles		18.00*
Scrap rails		18.50
Rerolling rails		20.50*
Angles & splice bars		20.50*
Rails 3 ft. & under		21.00*
Cast iron carwheels	16.50 to	17.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting		$20.00*
No. 2 hvy. melting		20.00*
Low phos. plate		22.50*
No. 1 busheling		20.00*
Hydraulic bundles		20.00*
Mach. shop turn.	$12.50 to	13.00
Short shovel. turn.	15.50 to	16.00
Cast iron borings	14.50 to	15.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting		$15.33*
No. 2 hvy. melting		15.33*
Comp. black bundles		15.33*
Comp. galv. bundles		13.33*
Mach. shop turn.	$9.00 to	9.50
Mixed bor. & turn.	9.00 to	9.50
Shoveling turn.	11.00 to	11.50
No. 1 cupola cast		20.00*
Hvy. breakable cast		16.50*
Charging box cast		19.00*
Stove plate		19.00*
Clean auto cast		20.00*
Unstrip. motor blks.		17.50*
Cl'n chem. cast bor.		14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting		$19.25*
No. 1 bundles		19.25*
No. 2 bundles		19.25*
No. 2 hvy. melting		19.25*
Mach. shop turn.	$12.50 to	13.00
Shoveling turn.		15.50
Cast iron borings		13.50
Mixed bor. & turn.		12.50
No. 1 cupola cast		20.00*
Stove plate		19.00*
Low phos. plate		21.75*
Scrap rails		20.75*
Rails 3 ft. & under		22.75*
RR. steel wheels		23.75*
Cast iron car wheels		20.00*
RR. coil & leaf spgs.		23.75*
RR. knuckles & coup.		23.75*
RR. malleable		22.00*
No. 1 busheling		19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting		$19.50*
No. 2 hvy. melting		19.50*
Compressed sheet stl.		19.50*
Drop forge flashings		19.00*
No. 2 bundles		19.50*
Mach. shop turn.	$11.50 to	12.00
Short shovel.	15.00 to	15.50
No. 1 busheling		19.50*
Steel axle turn.		19.00*
Low phos. billet and bloom crops		24.50*
Cast iron borings	14.00 to	14.50
Mixed bor. & turn.	12.50 to	13.00
No. 2 busheling		17.00*
No. 1 machine cast		20.00*
Railroad cast		20.00*
Railroad grate bars		15.25*
Stove plate		19.00*
RR. hvy. melting		20.50*
Rails 3 ft. & under		23.00*
Rails 18 in. & under		24.25*
Rails for rerolling		23.00*
Railroad malleable		22.00*
Elec. furnace punch		22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting		$16.50
No. 1 hvy. melting		16.50
No. 2 hvy. melting		15.00
No. 2 bales	$13.50 to	14.25
No. 3 bales	9.50 to	10.50
Mach. shop turn.		7.00
Elec. furn. 1 ft., und.	15.50 to	17.00
No. 1 cupola cast	19.00 to	21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$14.50 to	$15.50
No. 2 hvy. melting	13.50 to	14.50
No. 2 bales	12.50 to	13.50
No. 3 bales	9.00 to	10.00
Mach. shop turn.		4.50
No. 1 cupola cast	19.00 to	21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting		$14.50
No. 1 hvy. melting		14.50*
No. 3 bundles		11.50
Elec. furn. 1 ft., und.		17.00
No. 1 cupola cast		20.00*

Comparison of Prices . .

Advances Over Past Week in Heavy Type; Declines in *Italics*. Prices are F.O.B. Major Basing Points. The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 152-161.

Flat Rolled Steel (Cents Per Lb.)	July 17, 1945	July 10, 1945	June 12, 1945	July 18, 1944
Hot rolled sheets	2.20	2.20	2.20	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.70	3.70	3.70	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.25	2.25	2.25	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.25	2.25	2.25	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Bright wire	2.75	2.75	2.75	2.60
Wire nails	2.90	2.90	2.90	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$43.00	$43.00	$43.00	$40.00
Light rails	45.00	45.00	45.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$36.00	$36.00	$36.00	$34.00
Sheet bars	36.00	36.00	36.00	34.00
Slabs, rerolling	36.00	36.00	36.00	34.00
Forging billets	42.00	42.00	42.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.15	2.15	2.15	2.00
Skelp	1.90	1.90	1.90	1.90

Latest steel price increase, Amendment 13 to RPS6, effective May 23, 1945.

Pig Iron: (Per Gross Ton)	July 17, 1945	July 10, 1945	June 12, 1945	July 18, 1944
No. 2 fdy., Philadelphia	$26.84	$26.84	$26.84	$25.84
No. 2, Valley furnace	25.00	25.00	25.00	24.00
No. 2, Southern, Cin'ti	26.11	26.11	26.11	25.11
No. 2, Birmingham	21.38	21.38	21.38	20.38
No. 2, foundry, Chicago†	25.00	25.00	25.00	24.00
Basic, del'd eastern Pa.	26.34	26.34	26.34	25.34
Basic, Valley furnace	24.50	24.50	24.50	23.50
Malleable, Chicago†	25.00	25.00	25.00	24.00
Malleable, Valley	25.00	25.00	25.00	24.00
L. S. charcoal, Chicago*	42.34	42.34	42.34	37.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡ For carlots at seaboard.
Last pig iron price change authorized by OPA effective Feb. 14, 1945.
* Charcoal price increase retroactive to March 7, on contracts to Feb. 13.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.00	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$7.50	$7.50	$7.50	$7.00
Foundry coke, prompt	9.00	9.00	9.00	8.25
Non-Ferrous Metals: (Cents Per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
July 17, 1945	2.41571c. a Lb.	$24.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.41571c. a Lb.	$24.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.41571c. a Lb.	$24.61 a Gross Ton	$18.92 a Gross Ton
One year ago	2.30837c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	HIGH	LOW	HIGH	LOW	HIGH	LOW
1945	2.41571c., May 29	2.21189c., Jan. 2	$24.61, Feb. 20	$23.61, Jan. 2	$19.17	$19.17
1944	2.30837c., Sept. 5	2.21189c., Oct. 5	$23.61	$23.61	19.17	$15.67, Oct. 24
1943	2.25513c.	2.25513c.	23.61	23.61	19.17	19.17
1942	2.26190c.	2.26190c.	23.61	23.61	19.17	19.17
1941	2.43078c.	2.43078c.	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 8
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c. Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

The SHELDON MACHINE CO. Inc.

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OF

THE VERNON LINE OF MACHINE TOOLS

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VERNON HORIZONTAL MILLING MACHINES

VERNON VERTICAL MILLING MACHINES

VERNON TWELVE-INCH BACK GEARED SHAPER

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THESE QUALITY MACHINE TOOLS
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Vernon
QUALITY MACHINE TOOLS

Descriptive circulars will be sent if requested of the Sheldon Machine Co., Inc. 4210 N. Knox Ave., Chicago 41, Ill.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb. unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per 100 lb. under base; primes, 25c. above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. For price exceptions to finished and semi-finished steels turn two pages.

Basing Point / Product	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars [10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.30¢	2.20¢		2.75¢	2.30¢	2.44¢	2.37¢
Cold rolled [1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 gage)	3.70¢	3.70¢	3.70¢		3.70¢	3.70¢	3.70¢	3.70¢	3.80¢	3.70¢		4.25¢		3.94¢	3.87¢
Enameling (20 gage)	3.45¢	3.45¢	3.45¢	3.45¢			3.45¢		3.55¢	3.45¢		4.10¢	3.55¢	3.81¢	3.77¢
Long ternes [2]	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot rolled [3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled [4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester=3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester=3.35¢)					3.05¢	3.31¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.36¢	5.32¢
Electro, box 0.25 lb.	$4.35	$4.35	$4.35												
Electro, box 0.50 lb.	$4.50	$4.50	$4.50						$4.60						
Electro, box 0.75 lb.	$4.65		$4.65						$4.75						
BLACK PLATE															
29 gage [5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[11]			3.37¢
TERNES, MFG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢		(Duluth=2.35¢)			2.60¢	2.90¢	2.35¢	2.59¢	2.57¢
Rail steel [6]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢					2.60¢	2.90¢			
Reinforcing (billet) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold finished [8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢		(Detroit=2.70¢)			(Toledo=2.80¢)			2.99¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton=2.70¢)					2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont=2.25¢)							
Carbon steel [13]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢		2.25¢	2.25¢			2.60¢	2.80¢	2.47¢	2.44¢	2.30¢
Floor plates	3.50¢	3.50¢									3.85¢	4.15¢		3.86¢	3.82¢
Alloy	3.50¢	3.50¢			(Coatesville=3.50¢)						3.95¢	4.15¢		3.70¢	3.50¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem=2.10¢)			2.45¢	2.75¢		2.27¢	3.315¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester=3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester=4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester=6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester=8.55¢)								
WIRE [9]															
Bright [12]	2.75¢	2.75¢		2.75¢	2.75¢		(Worcester=2.85¢)		(Duluth=2.80¢)			3.25¢			3.07¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire base														
Spring (High Carbon)	3.35¢	3.35¢		3.35¢			(Worcester=3.45¢)					3.85¢			3.67¢
PILING															
Steel Sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

SEMI-FINISHED STEEL

Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill.... $31.00

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown $36.00

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh $45.00

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.00 higher; delivered E. Michigan, $3 higher; f.o.b. Duluth, billets only, $2.00 higher; billets f.o.b. Pacific ports are $12 higher. Provo, $11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

	Per Gross Ton
Rerolling	$36.00
Forging quality	42.00

Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem, per gross ton $54.00

Price delivered Detroit $2.00 higher; East Michigan, $3.00 higher.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Open hearth or bessemer	$36.00

PRICES

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(*No. 5 to 9/32 in.*)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.15c.
Worcester, Mass.	2.25c.
Birmingham	2.15c.
San Francisco	2.65c.
Galveston	2.40c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

RAILS, TRACK SUPPLIES

(*F.o.b. Mill*)

Standard rails, heavier than 60 lb., No. 1 O.H., gross ton	$43.00
Angle splice bars, 100 lb.	2.70
(*F.o.b. Basing Points*)	*Per Gross Ton*
Light rails (from billets)	$45.00
Light rails (from rail steel)	44.00
	Base per Lb.
Cut spikes	3.25c.
Screw spikes	5.40c.
Tie plate, steel	2.30c.
Tie plates, Pacific Coast	2.45c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.

TOOL STEEL

(*F.o.b. Pittsburgh, Bethlehem, Syracuse*)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

WIRE PRODUCTS

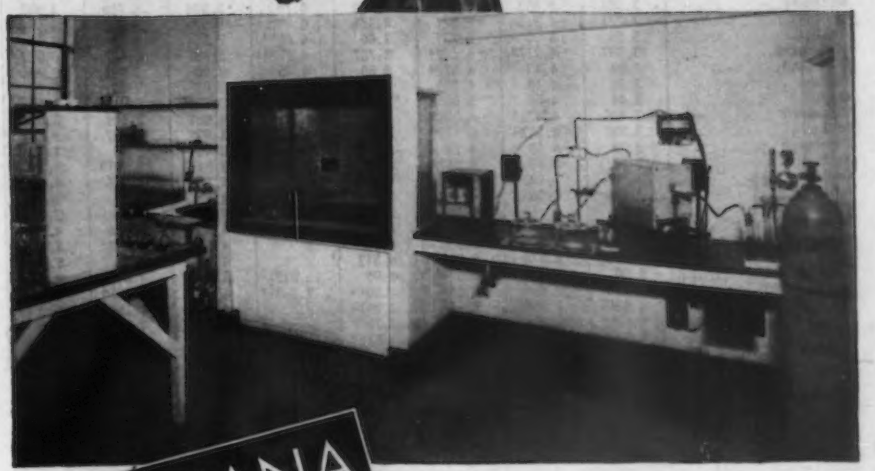
To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	*Pacific Coast Basing Points†*
	Base per Keg	
Standard wire nails	$2.90	$3.40
Coated nails	2.90	3.40
Cut nails, carloads	3.85	....
	Base per 100 Lb.	
Annealed fence wire	$3.05	$3.55
Annealed galv. fence wire	3.40	3.90
	Base Column	
Woven wire fence*	67	85
Fence posts, carloads	69	86
Single loop bale ties	66	91
Galvanized barbed wire**	72	82
Twisted barbless wire	72	....

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

HIDDEN QUALITY



MICHIANA
Heat-Resistant and Corrosion-Resistant ALLOY CASTINGS

The Extra Value In Every MICHIANA Alloy Casting

In a finely wrought sword, a most important quality is the skill, precision and specialized experience of the master craftsman. Yet these elements of value become manifest only through use of the finished product.

Similarly, the value of intensive research and testing conducted in MICHIANA laboratories, plus the long study and experimentation of specialized alloy metallurgists, becomes evident only in the practical application of MICHIANA castings. These extra values are then revealed in lower production costs through longer heat-hours, consistent uniformity of quality and exceptional durability.

MICHIANA has specialized in the alloy division of the foundry industry for over a quarter of a century. During this time a vast number of different alloys, with varying chemical compositions and physical properties, have been successfully produced.

MICHIANA invites you to make use of their extensive store of metallurgical knowledge, foundry technique, skill, and experience on your present and future alloy casting problems.

Further details, illustrations, designs and stress tables are included in Bulletin 110. Send for your copy today.

MICHIANA PRODUCTS CORPORATION

Michigan City, Indiana

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	$3.518	$4.872[5]	$4.768[a]	$3.922	$4.772	$3.605	$3.686	$3.822	$4.072	$5.816	$6.866	$7.072	$9.172
New York	3.59	4.613[3]	5.110	3.974[6]	4.772	3.768	3.758	3.853	4.103	5.858	6.908	7.103	8.203
Boston	3.744	4.744[9]	5.224[9]	4.106	4.715	3.912	3.912	4.044	4.144	6.012	7.062	7.194	8.394
Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.052	....	....	....	....
Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.085	4.165	....	....	....	....
Chicago	3.25	4.20	5.231	3.60	4.65[17]	3.55	3.55	3.50	3.75	5.60	6.65	6.65	7.90
Milwaukee	3.387	4.337[3]	5.272[4]	3.737	4.787[17]	3.687	3.687	3.637	3.887	5.837	6.887	6.837	7.987
Cleveland	3.35	4.40	4.877[4]	3.60	4.45	3.40	3.588	3.35	3.75	5.806	6.856	6.65	7.75
Buffalo	3.35	4.40	4.754	3.819	4.669	3.63	3.40	3.35	3.75	5.60	6.65	6.65	7.75
Detroit	3.45	4.50	5.004	3.70	4.859[17]	3.609	3.681	3.45	3.80	5.93	6.98	6.959	8.059
Cincinnati	3.425	4.475[3]	4.825[5]	3.675	4.711	3.661	3.691	3.611	4.011	5.95	7.00	7.011	8.261
St. Louis	3.397	4.347[3]	5.172[4]	3.747	4.931[17]	3.697	3.697	3.647	4.031	5.981	7.031	7.031	8.131
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.60	6.65	6.65	7.90
St. Paul	3.50	4.46	5.257[4]	3.86	5.102[17]	3.81[13]	3.81[13]	3.76[13]	4.361	5.94	5.99	7.361	8.461
Omaha	3.865	5.443	5.608[4]	4.215	....	4.165	4.165	4.115	4.443	....	....	....	....
Indianapolis	3.518	4.568	4.548	3.768	4.741	3.63	3.63	3.58	3.98	5.93	6.98	6.90	8.23
Birmingham	3.45	....	4.75	3.70	....	3.55	3.55	3.50	4.43	....	....	....	....
Memphis	3.965[7]	4.66	5.265	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058*	5.079	5.358	4.308	....	4.158	4.158*	4.108*	4.629	....	....	....	....
Houston	3.763	5.573	6.313[1]	4.313	....	4.25	4.25	3.75	6.373[3]	7.223	8.323	8.323	9.373
Los Angeles	5.00	7.203	6.104	4.95	5.613[15]	4.95	4.65	4.40	5.583	8.234	9.404	9.304	10.454
San Francisco	4.55[14]	7.304	6.354	4.50[14]	7.333[17]	4.65[14]	4.35[14]	4.15[14]	5.333	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.054	5.954	4.25[12]	....	4.75[12]	4.45[12]	4.35[12]	5.783	....	9.404	....	....
Portland	4.65[11]	6.604	5.754	4.75[11]	....	4.85[11]	4.45[11]	4.45[11]	5.533	8.304	9.404	8.304	9.404
Salt Lake City	4.530[17]	....	6.171[3]	5.53[17]	....	4.98[17]	4.98[17]	4.88[17]	5.90	....	....	....	....

National Emergency Steels

MILL EXTRAS

Designation	Basic Open-Hearth		Electric Furnace		Designation	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 8612	0.65¢	$13.00	$1.15	$23.00	NE 9427	0.75¢	$15.00	$1.25	$25.00
NE 8615	0.65	13.00	1.15	23.00	NE 9430	0.75	15.00	1.25	25.00
NE 8617	0.65	13.00	1.15	23.00	NE 9432	0.75	15.00	1.25	25.00
NE 8620	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 8622	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 8625	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 8627	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 8630	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 8632	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 8635	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 8637	0.65	13.00	1.15	23.00					
NE 8640	0.65	13.00	1.15	23.00					
NE 8642	0.65	13.00	1.15	23.00	NE 9722	0.65	13.00	1.15	23.00
NE 8645	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 8647	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 8650	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
					NE 9742	0.65	13.00	1.15	23.00
					NE 9745	0.65	13.00	1.15	23.00
NE 8712	0.70	14.00	1.20	24.00	NE 9747	0.65	13.00	1.15	23.00
NE 8715	0.70	14.00	1.20	24.00	NE 9750	0.65	13.00	1.15	23.00
NE 8717	0.70	14.00	1.20	24.00	NE 9763	0.65	13.00	1.15	23.00
NE 8720	0.70	14.00	1.20	24.00	NE 9768	0.65	13.00	1.15	23.00
NE 8722	0.70	14.00	1.20	24.00					
NE 8725	0.70	14.00	1.20	24.00					
NE 8727	0.70	14.00	1.20	24.00	NE 9830	1.30	26.00	1.80	36.00
NE 8730	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00
NE 8732	0.70	14.00	1.20	24.00	NE 9836	1.30	26.00	1.80	36.00
NE 8735	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00
NE 8737	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00
NE 8740	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00
NE 8742	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00
NE 8745	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00
NE 8747	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00
NE 8750	0.70	14.00	1.20	24.00					
					NE 9912	1.20	24.00	1.55	31.00
NE 9415	0.75	15.00	1.25	25.00	NE 9915	1.20	24.00	1.55	31.00
NE 9417	0.75	15.00	1.25	25.00	NE 9917	1.20	24.00	1.55	31.00
NE 9420	0.75	15.00	1.25	25.00	NE 9920	1.20	24.00	1.55	31.00
NE 9422	0.75	15.00	1.25	25.00	NE 9922	1.20	24.00	1.55	31.00
NE 9425	0.75	15.00	1.25	25.00	NE 9925	1.20	24.00	1.65	31.00

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, AISI Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and $5 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of $2.70 for 100 lb. on finished products and $54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base.

NE ALLOY BARS: 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271c. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00

PRICES

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)
Base Price—$200.00 per Net Ton

	Black	Galv.
Steel (Butt Weld)		
⅛ in.	63½	51
¼ in.	66½	55
⅜ to 3 in.	68½	57½
Wrought Iron (Butt Weld)		
⅛ in.	24	3½
¼ in.	30	10
⅜ and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18
Steel (Lap Weld)		
2 in.	61	49½
2½ in. and 3 in.	64	52½
3½ to 6 in.	66	54½
Wrought Iron (Lap Weld)		
2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17
Steel (Butt, extra strong, plain ends)		
⅛ in.	61½	50½
¼ in.	65½	54½
⅜ to 3 in.	67	57
Wrought Iron (Same as Above)		
⅛ in.	25	6
¼ in.	31	12
⅜ to 2 in.	38	19½
Steel (Lap, extra strong, plain ends)		
2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56
Wrought Iron (Same as Above)		
2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

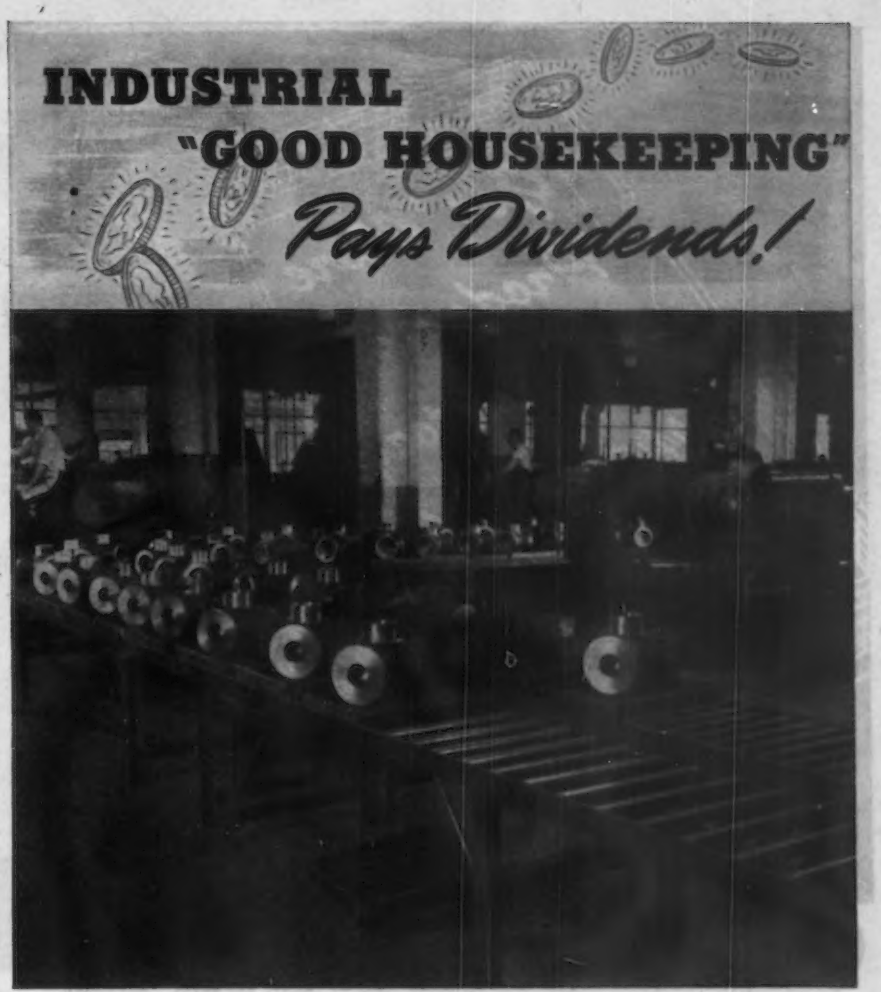
BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. and over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. or 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%



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ORDER and cleanliness — freedom from congestion—smooth flowing channels for production — safety for workers — these are important additional advantages gained from conveyors — they contribute substantial added savings to time and handling-cost economies conveyors provide.

The steps you take now — the investment in conveyors that you make at this time to coordinate your production — eliminate disorder and confusion — cut your handling costs — will not only pay immediate dividends but yield an even greater return in the days of competitive production to come.

Knowing how to apply power and gravity conveyors to best advantage is equally as important as building them well. An experience record of more than 40 years, serving all classes of industry and business, qualifies Standard Conveyor to be of service to you.

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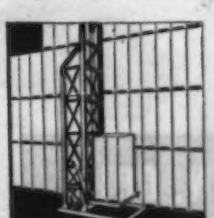
TIERING AND LIFTING MACHINES

PORTABLE PILERS

SPIRAL CHUTES

PNEUMATIC TUBE SYSTEMS

ELECTRO-COATED ZINC, COPPER, NICKEL AND BRASS . . HOT DIPPED TIN AND SOLDER . . LACQUER COATED IN COLORS . . UNCOATED PRECISION STRIP, CARBON AND ALLOY SPECIALTIES.

When it comes to making a choice of materials for your product, don't overlook precoated cold rolled strip steel. ThomaStrip is available with coatings of zinc, copper, brass, nickel, tin, solder, and lacquer in color. These precoated finishes solve your plating and finishing problems *and often entirely eliminate plating in fabricating plants.* Crackproof and peelproof finishes speed production and provide uniform coatings on inside and out of complicated parts. Write for literature today.

THE THOMAS STEEL CO. · WARREN, OHIO

COLD ROLLED STRIP STEEL SPECIALISTS

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	$68.55
First quality, Pa., Md., Ky., Mo., Ill.	54.45
First quality, New Jersey	59.45
Sec. quality, Pa., Md. Ky., Mo., Ill.	49.40
Sec. quality, New Jersey	54.15
No. 1 Ohio	45.75
Ground fire clay, net ton	8.05

Silica Brick

Pennsylvania and Birmingham	$54.45
Chicago District	62.45
Silica cement, net ton (Eastern)	9.55

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.48
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

EXCEPTIONS TO RPS 6

Ingots, carbon, rerolling—Phoenix Iron Co. may charge $38.75; Kaiser Co., $43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., $34.25; Pgh. Steel Co., $33.10. Granite City Steel, $39.45.

Ingots, carbon, forging—Phoenix Iron Co. may charge $43.00; Empire Sheet & Tinplate Co., $39.25, f.o.b. Mansfield, Ohio; West Coast producers, $48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., $38.10.

Ingots, alloy—C/l delivered Detroit add $2.00; delivered East Michigan add $3.00. Connors Steel Co. may charge $45.00 f.o.b. Birmingham.

Slabs, per gross ton—Andrews Steel Co. $41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. $41; Phoenix Iron Co. (rerolling) $41, (forging) $47; Granite City Steel $47.50; Kaiser Co., (rerolling) $58.64, (forging) $64.64, f.o.b. Los Angeles.

Blooms, per gross ton—Phoenix Iron Co. (rerolling) $41; (forging) $47; Pgh. Steel Co. (rerolling) $38.25, (forging) $44.25; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth; Kaiser Co. (rerolling) $58.64, (forging) $64.64 (shell steel) $74.64 f.o.b. Los Angeles.

Sheet Bar, per gross ton—Empire Sheet & Tinplate Co. $39 mill; Wheeling Steel Corp. $38 Portsmouth, Ohio.

Billets, Forging, per gross ton—Andrews Steel Co. $50 basing pts.; Follansbee Steel Corp. $49.50 Toronto, Ohio; Phoenix Iron Co. $47 mill; Geneva Steel Co. $64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. $49.50; Kaiser Co. $64.64, (shell steel) $74.64, f.o.b. Los Angeles.

PRICES

Billets, Rerolling, per gross ton—Continental Steel Corp. may charge Acme Steel in Chicago switching area $34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) $41 mill; Wheeling Steel Corp. 4 in. sq. or larger $37.75, smaller $39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at $39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. $41 mill; Continental Steel Corp. (1¾ x 1¾) $39.50, (2 x 2) $40.60 Kokomo, Ind. (these prices include $1 size extra); Keystone Steel & Wire Co. $36.40 Peoria; Connors Steel Co. $50.60 Birmingham; Ford Motor Co. $34 Dearborn, Mich.; Geneva Steel Co. $58.64 f.o.b. Pacific Coast; Pgh. Steel Co. $43.50; Kaiser Co. $58.64 f.o.b. Los Angeles.

Structural Shapes—Phoenix Iron Co. 2.35c. basing pts. (export) 2.50c. Phoenixville; Knoxville Iron Co. 2.30c. basing points; Kaiser Co. 3.20c. f.o.b. Los Angeles.

Rails, per gross ton—Sweet Steel Co. (rail steel) $50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron, $45 Pueblo.

Hot Rolled Plate—Granite City Steel Co. 2.85c. produced on DPC eqpt., 2.35c. otherwise; Knoxville Iron Co. 2.25c. basing pts.; Kaiser Co. and Geneva Steel Co. 3.20c. Pacific Ports; Central Iron and Steel Co. 2.50c. basing points; Granite City Steel Co. 2.35c. Granite City.

Merchant Bars—W. Ames Co., 10 tons and over, 2.85c. mill; Eckels-Nye Steel Corp. 2.50c. basing pts. (rail steel) 2.40c.; Phoenix Iron Co. 2.40c. basing pts.; Sweet Steel Co. (rail steel) 2.33c. mill; Joslyn Mfg. & Supply Co., 2.35c. Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar), 2.35c. Chicago; Knoxville Iron Co., 2.30c. basing pts.; Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.ob Madison, Ill.; Milton Mfg. Co., 2.75c. f.o.b. Milton, Pa.

Pipe Skelp—Wheeling Steel, Benwood, 2.05c.

Reinforcing Bars—W. Ames & Co., 10 tons and over, 2.85c. mill; Sweet Steel Co. (rail steel), 2.33c. mill; Columbia Steel Co., 2.50c. Pacific Ports.

Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Mansfield, Mass., f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants, f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass., f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co., for delivery except Texas and Okla., Chicago base, f.o.b. Fort Worth, Tex.; Connors Steel Co., shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co., 2.30c. Chicago; Knoxville Iron Co., 2.25c. basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel, 2.25c. Parkersburg. Granite City Steel 2.45c.

Galvanized Sheets—Andrews Steel Co. 3.75c. basing pts.; Parkersburg Iron & Steel Co., 3.85c. Parkersburg; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is 2.45c. per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

Wire Products—Pittsburgh Steel Co., f.o.b. Pittsburgh, per 100 lb., rods, No. 5 to 9/32 in., 2.20c.; rods, heavier than 9/32, 2.35c.; bright wire, 2.725c.; bright nails, 2.90c.; lead and furnace annealed wire, 2.85c.; pot annealed wire, 2.85c.; galvanized barbed wire, 3.90c.; plain staples, 2.55c.; galvanized staples, 2.65c.; bright spring wire, 3.30c.; galvanized spring wire, 3.45c.

—on why "R-C" Rotary Positive Gas Meters are tops both in accuracy and long life. It explains why their built-in accuracy is permanent; why they need no adjustments; and why maintenance cost is the lowest of any gas meter on the market. Bulletin 40-B-13 gladly mailed on request.

ROOTS-CONNERSVILLE BLOWER CORP.
One of the Dresser Industries
507 Ohio Avenue, Connersville, Indiana

Roots CONNERSVILLE SINCE 1854 — Rotary Positive GAS METERS

CONCO 3-Motor Single Girder CAB OR FLOOR OPERATED

ELECTRIC CRANE . . .

● **Available in capacities of one through five tons for floor or cab operation. Simply, ruggedly designed for low first cost and maintenance. Used with Low Headroom Type Hoist, provides for maximum space coverage horizontally and vertically. Effective in even a minimum space. Write for Bulletin 2000.**

Write for Bulletin 26000 describing the Torpedo Hoist shown. Three capacities 250 lb.—$139.50, 500 lb.—$149.50, 1000 lb—$159.50. Heavily, simply built, with Push Button Control. Outstanding in CONCO'S complete line of hand-powered and electric Cranes, Hoists, Trolleys.

CONCO ENGINEERING WORKS
Div. of H. D. Conkey & Co. — 15 Grove St. — Mendota, Ill.
Builders Of Conco Torpedo Electric Hoist

BASING POINT* BASE PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	$25.50	$26.00	$26.50	$27.00	....
Birdsboro	25.50	26.00	26.50	27.00	$30.50
Birmingham	20.00	21.38	....	26.00	....
Buffalo	24.00	25.00	25.50	26.00	30.50
Chicago	24.50	25.00	25.00	25.50	....
Cleveland	24.50	25.00	25.00	25.50	....
Detroit	24.50	25.00	25.00	25.50	....
Duluth	25.00	25.50	25.50	26.00	....
Erie	24.50	25.00	25.50	26.00	....
Everett	25.50	26.00	26.50	27.00	....
Granite City	24.50	25.00	25.00	25.50	....
Hamilton	24.50	25.00	25.00	....	....
Neville Island	24.50	25.00	25.00	25.50	....
Provo	22.50	23.00	....	....	....
Sharpsville[1]	24.50	25.00	25.00	25.50	....
Sparrows Point	25.50	26.00	....	....	....
Steelton	25.50	....	....	....	30.50
Swedeland	25.50	26.00	26.50	27.00	....
Toledo	24.50	25.00	25.00	25.50	....
Youngstown	24.50	25.00	25.00	25.50	....

DELIVERED PRICES† (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$ .50	$26.00	$26.50	$27.00	$27.50	....
Boston	Birdsboro-Steelton	4.02	....	....	....	....	$34.52
Brooklyn	Bethlehem	2.50	28.00	28.50	29.00	29.50	....
Brooklyn	Birdsboro	2.92	....	....	....	....	33.42
Canton	Cleveland	1.39	25.89	26.39	26.39	26.89	....
Canton	Buffalo	3.19	....	....	....	....	33.69
Cincinnati	Birmingham	4.06	24.06	25.44	....	....	....
Cincinnati	Hamilton	1.11	....	....	26.11	....	....
Cincinnati	Buffalo	4.40	....	....	....	....	34.96
Jersey City	Bethlehem	1.53	27.03	27.53	28.03	28.53	....
Jersey City	Birdsboro	1.94	....	....	....	....	32.44
Los Angeles	Provo	4.95	27.45	27.95	....	....	....
Los Angeles	Buffalo	15.41	....	....	....	....	46.91
Mansfield	Cleveland & Toledo	1.94	26.44	26.94	26.94	27.44	....
Mansfield	Buffalo	3.36	....	....	....	....	33.86
Philadelphia	Swedeland	.84	26.34	26.84	27.34	27.84	....
Philadelphia	Birdsboro	1.24	....	....	....	....	31.74
San Francisco	Provo	4.95	27.45	27.95	....	....	....
San Francisco	Buffalo	15.41	....	....	....	....	46.91
Seattle	Provo	4.95	27.45	27.95	....	....	....
Seattle	Buffalo	15.41	....	....	....	....	46.91
St. Louis	Granite City	.50	25.00	25.50	25.50	26.00	....
St. Louis	Buffalo	7.07	....	....	....	....	37.57

* Maximum per gross ton, established by OPA February 14, 1945. † Prices do not reflect 3 per cent tax on freight.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10, April 11, 1945, retroactive to March 7, 1945. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 per cent silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 per cent, C/L per G.T., f.o.b. Jackon, Ohio—$30.50; f.o.b. Buffalo—$31.75. Add $1.00 per ton for each additional 0.50% Si. Add 50c. per ton for each 0.50% Mn over 1.00%. Add $1.00 per ton for 0.75% or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh	21½ to 23½c.
Copper, reduced, 150 and 200 mesh	20½ to 25½c.
Iron, commercial, 100 and 200 mesh 96 + % Fe	12½ to 15c.
Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots	4c.
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots	63c.
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42c.
Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90c.
Aluminum, 100 and 200 mesh	*23 to 27c.
Antimony, 100 mesh	20.6c.
Cadmium, 100 mesh	$1
Chromium, 150 mesh	$1.03
Lead, 100, 200 & 300 mesh	11½ to 12½c.
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51½c.
Solder powder, 100 mesh	8½c. plus metal
Tin, 100 mesh	58¾c.
Tungsten metal powder, 98%-99%, any quantity, per lb.	$2.60
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	$2.60
Under 100 lb.	$3.00

*Freight allowed east of Mississippi.

COKE

Furnace, beehive (f.o.b. oven)	Net Ton
Connellsville, Pa.	$7.50*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00
Foundry, By-Product	
Chicago, del'd	13.35
Chicago, f.o.b.	12.60
New England, del'd	14.25
Kearny, N. J., f.o.b.	12.65
Philadelphia, del'd	12.88
Buffalo, del'd	13.00
Portsmouth, Ohio, f.o.b.	11.10
Painesville, Ohio, f.o.b.	11.75
Erie, del'd	12.75
Cleveland, del'd	12.80
Cincinnati, del'd	12.85
St. Louis, del'd	13.35
Birmingham, del'd	10.50

*Hand drawn ovens using trucked coal permitted to charge $8.00 per ton plus transportation charges.

SPECIAL MACHINERY BUILT ON CONTRACT

BENDING AND STRAIGHTENING MACHINES

PUNCHING AND SHEARING MACHINERY

THOMAS

Punching & Shearing MACHINERY

NOW SOLD BY LEADING DISTRIBUTORS COAST TO COAST

FOR THE STRUCTURAL SHOP, BOILER SHOP, SHIPYARD, RAILROAD CAR SHOP AND ALLIED INDUSTRIES

ATLANTA, GA. Chandler Machinery Co.
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CHATTANOOGA, TENN....Noland Co.
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CINCINNATI, O..Brokaw Machinery Co.
CLEVELAND, O....George D. Miller Co.
DALLAS, TEX...C. J. Harter, Machinery
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LOS ANGELES, CALIF. Harron, Rickard & McCone Co.
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NEW ORLEANS, LA...Frederic & Baker
NEW YORK, N. Y.....Giebel, Inc.
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RICHMOND, VIRGINIA Smith-Courtney Co.
ROCHESTER, N. Y.....W. W. Wentz
SALT LAKE CITY, UTAH..J. M. Grisley
SAN FRANCISCO, CALIF. Harron, Rickard & McCone Co.
SEATTLE, WASH. Dawson Machinery Co.
SHREVEPORT, LA. ....Frederic & Baker
ST. LOUIS, MO. Robert R. Stephens Machinery Co.
SYRACUSE, N. Y. C. H. Briggs Machine Tool Co., Inc.

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7

THOMAS MACHINE MANUFACTURING COMPANY

PITTSBURGH, PA.

PRICES

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1¼ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
⅛ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 per cent additional discount.

Stove Bolts	*Consumer*
Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws	*Consumer Per Cent Off List*
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.30c.
Armature	3.65c.
Electrical	4.15c.
Motor	5.05c.
Dynamo	5.75c.
Transformer 72	6.25c.
Transformer 65	7.25c.
Transformer 58	7.75c.
Transformer 52	8.55c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

Fast Tough

Heavy feed at high speed spells doom to the ordinary hack saw blade; down-time for your machine, extra expense in money, man hours, and production. The MARVEL Hack Saw Blade, because it is positively *unbreakable* under these conditions, should be "a must" tool in every efficiently operated shop. A tough alloy steel back is electrically welded to high speed steel teeth, producing a blade that can be pulled to almost unlimited tension; can withstand extra heavy feeds and the heat and abrasion of high speed heavy duty sawing.

The same exclusive *unbreakable* feature of MARVEL Hack Saw Blades is also a feature of MARVEL Hole Saws, giving these saws the ability to stand up under abuse. MARVEL Hole Saws cut holes from ⅜" to 4½" diameter in stock up to 1⅛" thick. Usable in portable drill, drill press, or lathe tail stock.

Heavy feed at high speed!

HIGH-SPEED-EDGE MARVEL

Complete Range of Metal Sawing Machines

Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

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5700 W. Bloomingdale Ave., Chicago 39, Illinois, U.S.A.

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"BUILT-IN" STAMINA

Specify **"ABBOTT"** *for*

UNINTERRUPTED PERFORMANCE

THE ABBOTT BALL COMPANY - HARTFORD 10, CONN.

Clarkator

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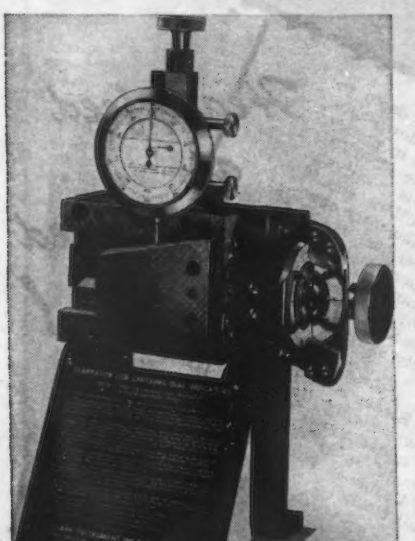

MICROMETER speed with sine bar precision—the fastest, most accurate method ever developed for checking dial indicators! Clarkator gives 100% inspection on every vital point. Checks comparators, hardness testers and all other instruments requiring precision dial indicating.

The Clarkator is sturdily built for long trouble-free service. Easy to operate—just four simple steps! Complete operating instructions are permanently attached to base.

Be sure of absolute accuracy of indicator readings. Put Clarkator to work for you. Regular use will provide a saving in test results alone worth many times its low cost! Illustrated 2-color circular contains complete descriptions and specifications of the Clarkator. Write for your free copy today! Dept. IA.

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TOMORROW'S ACCURACY TODAY

HARDNESS TESTER

INSTRUMENT, INC.

10200 Ford Rd., Dearborn, Mich.

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Carload lots (packed)	141.00
Less ton lots (packed)	148.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	36c.
L.c.l. lots	38c.

95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.

Carload, bulk	34c.
L.c.l. lots	35c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

	Eastern Zone	Central Zone	Western Zone
50% Si	6.65c.	7.10c.	7.25c.
75% Si	8.05c.	8.20c.	8.75c.
80-90% Si.	8.90c.	9.05c.	9.55c.
90-95% Si.	11.05c.	11.20c.	11.65c.

Spot sales add: 45c. per lb. for 50% Si, .3c. per lb. for 75% Si, .25c. per lb. for 80-90% and 90-95% Si.

Silvery Iron

Silvery Iron, Silicon 14.01 to 14.50 per cent, $45.50 per G. T. f.o.b. Jackson, Ohio. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for L.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	3.35c.	3.50c.	3.65c.
2000 lb-carload	3.8c.	4.2c.	4.25c.

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05c.
2000 lb. to carload	6.70c.
Under 2000 lb.	6.90c.
Briquets, contract, basis carlots, bulk freight allowed, per lb.	5.80c.
2000 lb. to carload	6.30c.
Less ton lots	6.55c.

Ferrochrome

(65-72% Cr. 2% max. Si)

OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .35c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C	23.00c.	23.40c.	24.00c.
0.10% C	22.50c.	22.90c.	23.50c.
0.15% C	22.00c.	22.40c.	23.00c.
0.20% C	21.50c.	21.90c.	22.50c.
0.50% C	21.00c.	21.40c.	22.00c.
1.00% C	20.50c.	20.90c.	21.50c.
2.00% C	19.50c.	19.90c.	21.00c.
66-71% Cr, 4-10%	13.00c.	13.40c.	14.00c.
62-66% Cr, 5-7% C	13.50c.	13.90c	14.50c.

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

	Carloads, Ton Bulk	Lots	Less Ton
0.10% max. C, 1 or 2% max. Si.	23.00c.	23.40c.	23.65c.
0.15% max. C, 1 or 2% max. Si.	22.00c.	22.40c.	22.65c.
0.30% max. C, 1 or 2% max. Si.	21.00c.	21.40c.	21.65c.
0.50% max. C, 1 or 2% max. Si.	20.00c.	20.40c.	20.65c.
0.75% max. C, 7.00% max. Si.	16.00c.	16.40c.	16.65c.

Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	8.25c.	8.55c.	8.95c.
Ton lots	8.75c.	9.25c.	10.75c.
Less ton lots	9.00c.	9.50c.	11.00c.

Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	6.05c.	6.30c.	6.60c.
Ton lots	6.65c.	7.55c.	8.55c.
Less ton lots	6.80c.	7.80c.	8.80c.

Calcium—Manganese—Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carloads	15.50c.	16.00c.	18.05c.
Ton lots	16.50c.	17.35c.	19.10c.
Less ton lots	17.00c.	17.35c.	19.60c.

Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

	Cast	Turnings	Distilled
Ton lots	$1.80	$2.30	$5.00
Less ton lots	2.30	2.80	5.75

Chromium—Copper

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.

Shot or ingot	45c.

Ferroboron

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	$1.20	$1.2075	$1.229
Less ton lots	1.30	1.3075	1.329

Manganese—Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.

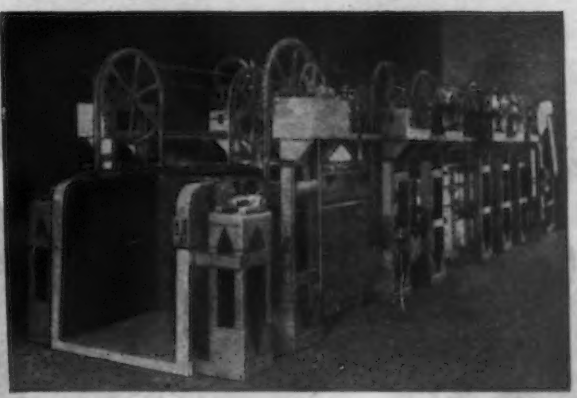
15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

	Eastern Zone	Central Zone	Western Zone
11,200 lb. or more	$1.90	$1.9125	$1.9445
Ton lots	2.00	2.09125	2.0445
Less ton lots	2.10	2.1125	2.1445

PRICES

Other Ferroalloys

Ferrotungsten, Standard grade lump or ¼X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa. York, Pa., per lb. contained tungsten, 10,000 lb. or more	$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.	
Open hearth	$2.70
Crucible	$2.80
Primos	$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal	$1.50
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5. Spot sales add 5c. per lb. contained V_2O_5	$1.10
Silcaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)	
Carload lots	25c.
2000 lb. to carload	26c.
Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)	
Carload lots	58c.
2000 lb. to carload	59c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis	
No. 1	87.5c.
No. 6	60c.
No. 79	45c.
Bortram, f.o.b. Niagara Falls	
Ton lots, per lb.	45c.
Less ton lots, per lb.	50c.
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.	
2000 lb. lots	$2.25
Under 2000 lb. lots	$2.30
Ferrotitanium, 40-45%, 0.10%C. max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti	$1 23
Less ton lots	$1.25
Ferrotitanium, 20-25%, 0.10%C. max., ton lots, per lb. contained titanium	$1.35
Less ton lots	$1.40
High-carbon ferrotitanium, 15%-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y. freight allowed East of Mississippi River, north of Baltimore and St. Louis, per carload	$142.50
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electrolytic 25-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo.	95c.
Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo.	80c.
Molybdenum oxide briquets, 48-52% Mo. f.ob. Langeloth, Pa. per lb. contained Mo	80c.
Molybdenum oxide, in cans, f.o.b Langeloth and Washington, Pa. per lb. contained Mo	80c.
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add ¼c. for spot sales	
Carload lots	14c.
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy	
Carload, bulk	4.6c.
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75c.
Ton lots	7.25c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.	
Car lots	8.00c.
Ton lots	8.75c.
Less ton lots	9.25c.



WASH

RINSE

PICKLE

and other cycles prior to enameling.

CLEAN and PHOSPHATE-COAT

before spray painting.

FIRST OF ALL . . . THE SURFACE MUST BE *THOROUGHLY CLEANED*

This Ransohoff machine with its cost-saving adaptability THOROUGHLY CLEANS metal surfaces as a pre-process or inter-process operation. It eliminates messy floors, improving working conditions; cleans at automatically controlled cycles and omits unnecessary handling; and can be used on a great variety of parts.

Carriers of the work may be (1) baskets for enamel ware (2) hairpin hooks for wire coils (3) chains with clamps or hooks for sheets or steel sash (4) flat platforms for baskets of forgings.

RANSOHOFF FIELD ENGINEERS will call at your plant to discuss plans for now or post-war.

EQUIPMENT FOR THE SURFACE TREATMENT OF METALS.

N. Ransohoff, Inc.

1315 TOWNSHIP AVE. • CINCINNATI 16, OHIO

Did you Know?

Over 50% of furnace wall radiation losses alone can be stopped? Therm-O-Flake insulation is preferred for this work in most steel plants.

Here's why!

Highest insulating value — easy to apply — low maintenance — low cost — high reclamation — sticks tightly to silica or basic brick — permits closer control of fuel-air ratios — reduces cold air infiltration.

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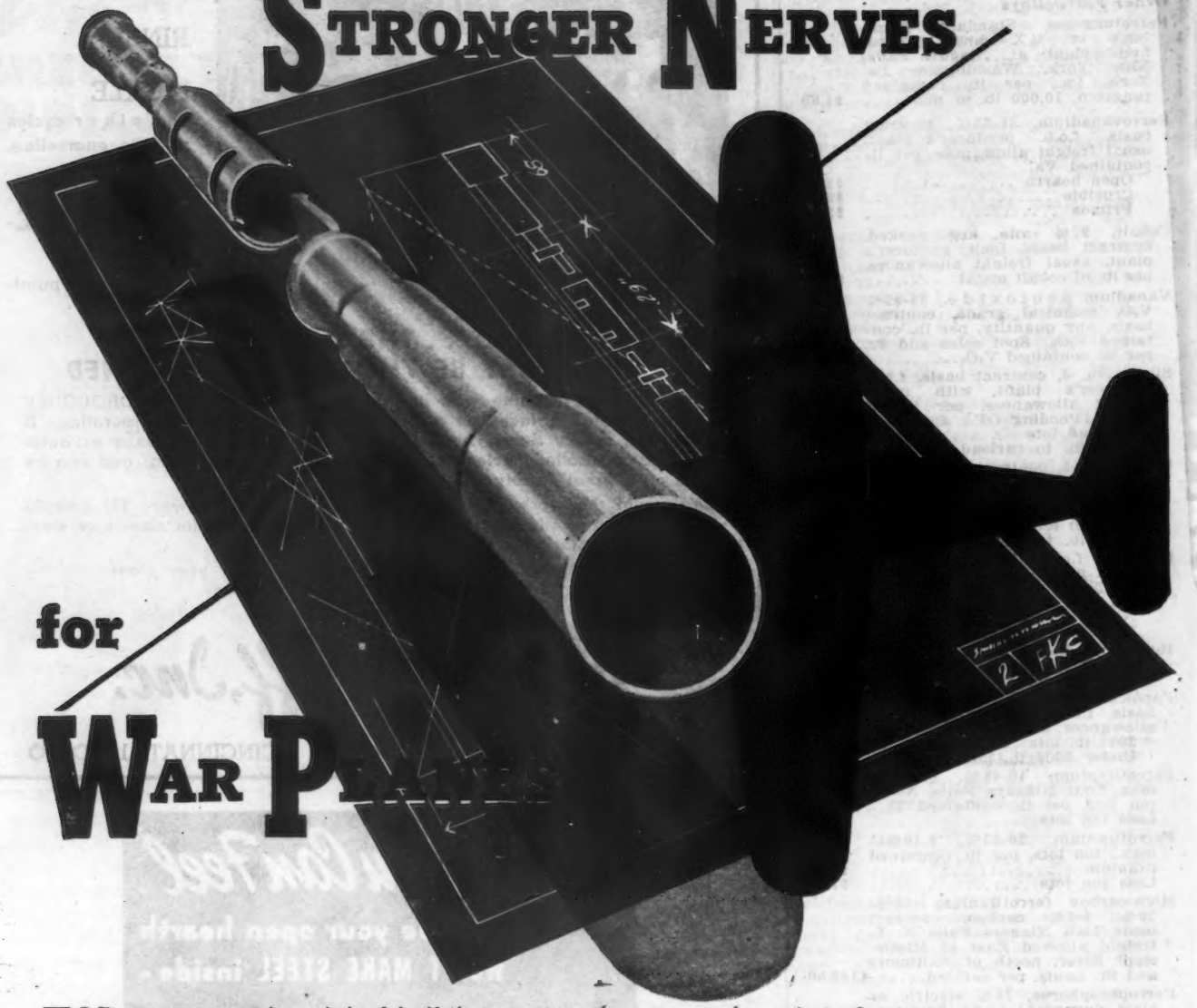
Therm-O-flake

HIGH TEMPERATURE INSULATION

BRICK - BLOCK - COATINGS - CONCRETE - GRANULES

STRONGER NERVES



for WAR P[illegible]

FOR extra speed in original building, and in making heat-of-battle repairs, current carrying wires—the nerves of war planes—are held together by pressure (solderless) fittings. These small fittings consist of two tips connected by a spring sleeve coupler.

The coupler shoulders two responsibilities. It presses the faces of the tips firmly together to maintain good electrical contact and also prevents the tips from unintentionally parting company. Spring tension without let-up is vitally important. The manufacturer, who tried almost every possible material for the coupler, settled finally upon Riverside *Beryllium Copper*. Interestingly enough, his choice was influenced not only by the favorable characteristics of Riverside *Beryllium Copper* but by realistic considerations of quality and delivery.

Our attention to quality and delivery is, in fact, second only to our interest in helping you benefit from the use of our alloys—*phosphor bronze, nickel silver, and beryllium copper.*

INSIDE RIVERSIDE—*In the hurry and rush of war times, many of us have forgotten the existence of a very important word—courtesy . . . How often we meet up with people who do not even attempt to give courteous treatment to those whom they are supposed to serve . . . We, at Riverside, try to avoid this pitfall. We make an extra effort to see that all of our customers—regardless of their size, or of the difficulty of their demands upon us—are given every courtesy and attention.*

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